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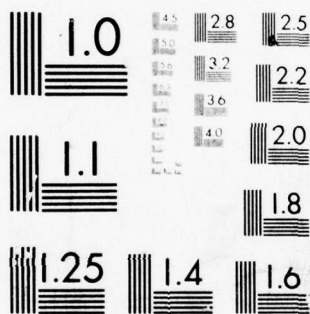
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PHYSICAL AND CHEMICAL DATA

CIRCE EXPEDITION

16 March - 1 December 1968

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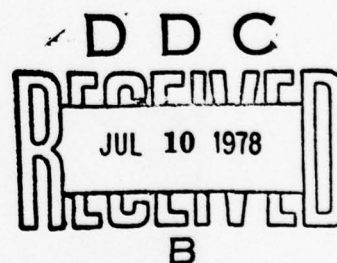
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CIRCE EXPEDITION

16 March - 1 December 1968

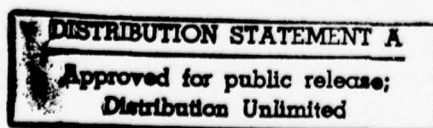
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## INTRODUCTION

CIRCE Expedition was primarily a deep-sea geological-geophysical cruise, with the work on Legs I and II consisting mainly of seismic reflection surveys and bottom sampling by core and dredge.

CIRCE Expedition, Legs VIII and IX, had three major objectives and several satellite programs; they were mainly geological and geochemical in orientation:

- 1) An examination of a portion of the Walvis Ridge off western South Africa with standard geophysical and geological methods to develop hypotheses regarding the origin of this aseismic ridge which has been variously considered a volcanic chain, an ancient fracture zone complex and an old plate boundary with a low rate of convergence and which has an obvious but not yet understood significance for the opening of the South Atlantic.

- 2) A sedimentological and geochemical study of the recent sediments and their overlying waters on the continental margin near Walvis Bay. Deposits of very high organic content have long been known to accumulate in this area, and various investigators have regarded them as precursors of organic metal-bearing shales of the Kupferschiefer type. One of the purposes of this cruise was to establish the nature and regional distribution of these sediments, relate their composition to overlying waters and circulation, and determine their composition and possible content of heavy metals and trace elements. This included a hydrographic and nutrient survey in the inner part of the Benguela Current with particular reference to upwelling and the composition (nutrient and oxygen contents) of the bottom water on the shelf.

- 3) Surveying a geophysical and geological traverse of the Mid-Atlantic Ridge at a mid-southern latitude where, so far, very little information exists. This traverse, supplemented with detailed area surveys in five locations was designed to provide further information on the origin of the crestal zone of the Ridge and associated fracture zones and on the evolution of the Ridge structure and relief with increasing distance from the Ridge axis. Magnetic observations and reflection profiling were continuous; bathymetric observations were made continuously when possible. Some plankton tows were made.

In addition, supplementary programs included a series of casts of a large-volume water sampler for a long-term study of radioactive fallout in the oceans for Woods Hole Oceanographic Institution (WHOI), a program of trace element studies of seawater for the University of Capetown, and a study of the alkalinity of Atlantic intermediate and deep water by Scripps Institution. Large volumes of seawater (surface to bottom) were collected at 5 stations on Leg VIII and at 4 stations on Leg IX, as well as at 9 other points from the surface only. These were analyzed for carbon 14 by Dr. J. C. Vogel, National Physical Research Laboratory, Pretoria, South Africa; for such fallout nuclides as strontium 90, cesium 137 and plutonium 238 and 239 by Dr. V. T. Bowen, WHOI; and aliquots were collected for later analysis for tritium by Dr. W. Roether, University of Heidelberg, Germany. This was a part of a continuing program using long-lived artificial radionuclides for the study of water or particle movement in the Atlantic Ocean.

The main programs were the responsibility of Oregon State University with collaboration from the University of Edinburgh, Scotland, for item 2).

Legs VIII and IX of CIRCE Expedition were supported by the Office of Naval Research. Supplementary funding for the main program came from a grant of the National Science Foundation to Oregon State University and for the fallout study from a contract of the Atomic Energy Commission with Woods Hole Oceanographic Institution. Further funding was provided by the South African Council for Scientific and Industrial Research, the Carnegie Trust for the Universities of Scotland, and International Nickel.

#### STANDARD PROCEDURES

The data presented in this report were collected on CIRCE Expedition Legs I, II, VIII and IX. The data were obtained from Nansen bottle casts and were collected and processed primarily by the Data Collection and Processing Group (DCPG, MLRG), Scripps Institution of Oceanography, University of California at San Diego.

The table below summarizes the hydrographic work completed on CIRCE:

<u>Leg</u>	<u>No. of Stations</u>	<u>Casts</u>	<u>Total No. of Bottles</u>	<u>Maximum Depth</u>
I	1	single	6	within 350m of bottom
II	4	single	5	within 350m of bottom
VIII	19	single	4-16	less than 350m
	1	single	21	~1500m
	5	multiple	22-51	bottom
IX	3	single	22	~1500m
	5	multiple	44-65	bottom

#### Hydrographic Casts

Temperature was measured with paired deep-sea reversing thermometers and is tabulated to hundredths of a Celsius degree. In some instances, however, specially scaled thermometers were used; these values are recorded to thousandths of a degree. Unprotected thermometers were included in most bottles lowered deeper than 100 meters.

Water samples for chemical and nutrient analyses were obtained from the Nansen bottles.

Salinity was determined with a conductive salinometer (Univ. of Wash., 1960). The values are recorded to three decimal places, provided



accepted standards are met. Salinity is recorded to two decimal places when only one determination per sample was obtained or where there is doubt about the accuracy of a particular sample or of all samples on a station.

Dissolved oxygen was determined by the Winkler method as revised by Carpenter (1965).

Reactive phosphate was determined by the method of Murphy and Riley (1960); reactive silicate by the method of Strickland and Parsons (1965); nitrate by the method of Wood et al. (1967); and nitrite by the method of Bendschneider and Robinson (1952).

The nutrient analyses on Leg VIII and subsequent processing were done by S. E. Calvert and N. B. Price, University of Edinburgh. Questions concerning these data should be directed to them.

Silicate data from Leg IX, stations 245 and 246, have been cited in Edmond and Anderson (1971). The silicate values used were calculated incorrectly, being about half what they should be. The correct values are tabulated in this report.

The observed data have been evaluated using the method described by Klein (1973). This involves consideration of their variation as functions of density or depth and their relations to each other, and comparison with previous or adjacent observations.

#### TABULATED DATA

Nansen bottle data are listed with observed values on the left side of the page and with interpolated and calculated values at standard depths on the right side of the page. The values listed at standard depths are computer interpolations according to a modified Rattray (1962) technique.

The time given for bottle casts is that of the messenger release in Greenwich Mean Time. When more than one cast was lowered on a station, the times for the first and last casts are given. The observed depths of multiple casts are footnoted except for the cast which includes the shallowest Nansen bottle.

The bottom depth, listed in meters, was determined by applying corrections from Matthews (1939) tables to echo soundings.

The weather and dominant waves are coded using the National Oceanographic Data Center (NODC) method.

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The column headings from the computer are explained as follows:

Z	Depth	Meters
T	Temperature	°C
S	Salinity	‰
O2	Dissolved oxygen	ml/L
P04	"Reactive" inorganic phosphate-phosphorus	µg at/L
Si03	"Reactive" inorganic silicate-silicon	µg at/L
N02	"Reactive" nitrite-nitrogen	µg at/L
N03	"Reactive" nitrate-nitrogen	µg at/L
DT	$\delta T$ Thermosteric anomaly	cl/ton
SIGT	$\sigma_t = (\rho_{s,t,0} - 1)10^3$ where $\rho_{s,t,0}$ is the density the parcel would have if moved isothermally to the sea surface.	g/L
DD	Geopotential anomaly, referred to the sea surface.	dyn. meters

#### FOOTNOTES

Data which appears to be in error without obvious reason is reported, but flagged uncertain with a U. Such data was not used in the determination of values at standard depths. Footnotes are used to indicate data which has required special processing.

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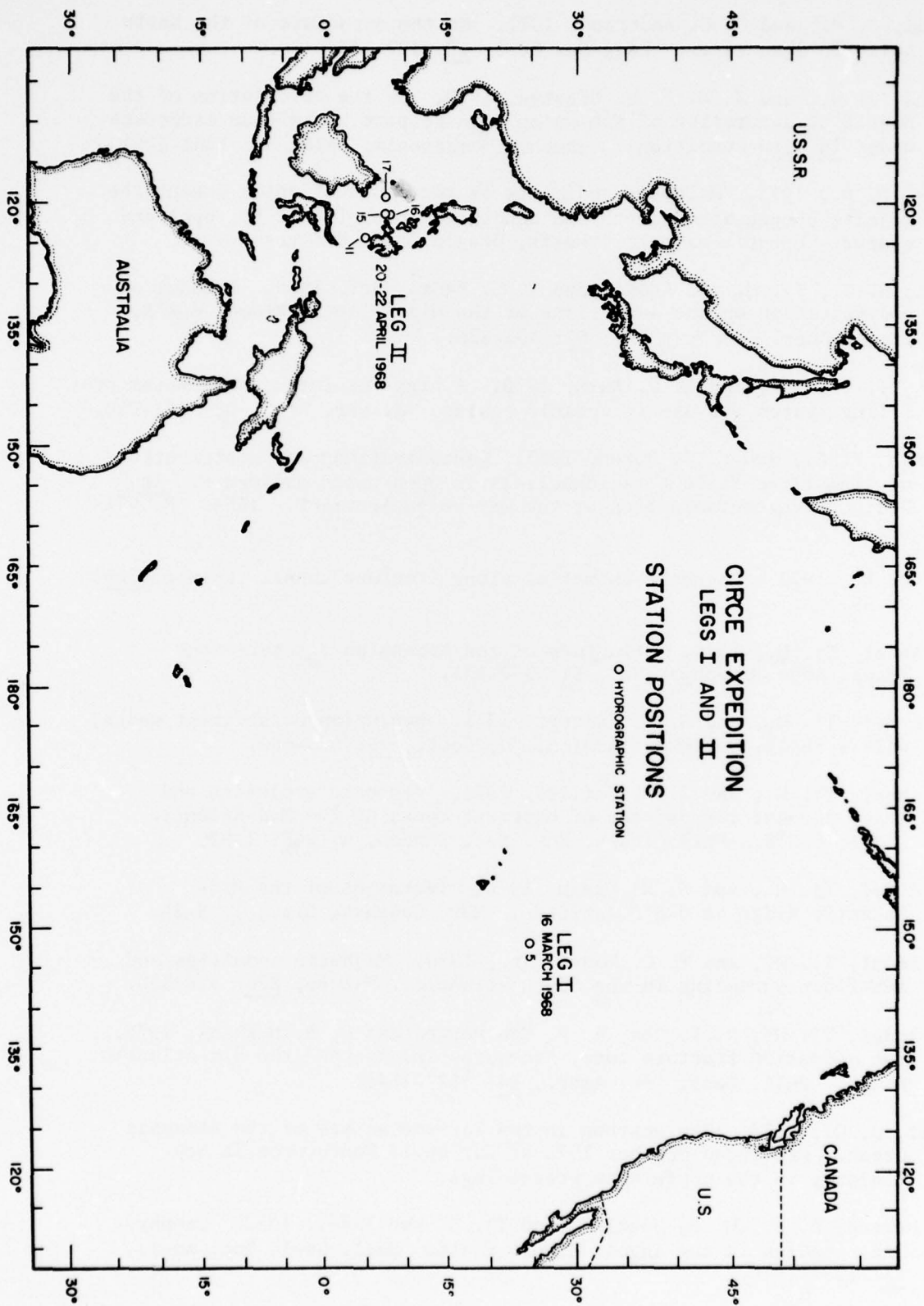


FIGURE 1

PERSONNEL  
CIRCE Expedition I and II

SHIP'S CAPTAIN

Phinney, Alan W. RV Argo, Legs I and II

PERSONNEL PARTICIPATING IN THE COLLECTION OF DATA

RV ARGO

Participation (Leg)

Shor, G. G., Jr., SIO*, Chief Scientist	I
Karig, D. E., SIO                   "           "	II
Abbott, J. L., SIO	I
Bach, J. E., SIO	I, II
Busch, R. J., U.S. Naval Oceanographic Office	II
Cornelius, J. F., International Business Machines	I, II
Dixon, F. S., SIO	I
Donovan, J. T., SIO	I
Earl, J. L., SIO	I, II
Edmond, J. M., SIO	I, II
Francheteau, J., SIO	II
Johnson, B. P., SIO	I
Jones, A. C., SIO	I
Kishii, T., Maizuru Marine Observatory	II
Kolesnikow, V., SIO	II
Kroopnick, P., SIO	I
Lee, J., Loyola University	I
Lucas, J. C., SIO	I
Morris, G. S., Jr., SIO	I
Mudie, J. D., SIO	I
Nagasaka, K., Maizuru Marine Observatory	II
Newhouse, D. A., SIO	I
Osborn, T., SIO	I
Pine, J. S., SIO	I, II
Rowe, R. A., SIO	I, II
Samora, F. E., SIO	I, II
Smith, M. V., Volunteer	I, II
Smith, W. L., SIO	I, II

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\* Scripps Institution of Oceanography

RV ARGO

CIRCE EXPEDITION I

5

LATITUDE		LONGITUDE		MO/DAY/YR		MESSENGER TIME		BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
24 38.8N		148 13.0W		03/16/68		0020		5350M	060	06KT	2	060 06 05
Z	T	S	02	P04	S103	N02	N03	DT				
339A	10.18	34.138	4.81					176.1				
3244	1.52	34.680	3.33					33.4				
3714		34.689	3.53									
4181		34.778	3.53									
4648		34.719	1.69									
5117	1.48	34.696	3.94					31.9				

A) THE DEPTHS ARE UNCERTAIN BECAUSE THE CAST WAS TAKEN WITH THE HEAT FLOW PROBE.  
THIS IS HEAT FLOW PROBE LOWERING ONE (HF-1).



## RV ARGO

## CIRCE EXPEDITION II

11

	LATITUDE 5 15.3N	LONGITUDE 124 32.0E	MO/DAY/YR 04/20/68	MESSENGER TIME 0658	BOTTOM 5771M	WIND	SPEED KT	WEATHER	DOMINANT WAVES
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	
3540A	3.64	34.596	2.24					57.1	
3973		34.593	2.27						
4451		34.592	2.27						
4935		34.596	2.28						
5415	3.86	34.593	2.32					59.4	

## RV ARGO

## CIRCE EXPEDITION II

.5

	LATITUDE 7 40.0N	LONGITUDE 121 28.0E	MO/DAY/YR 04/21/68	MESSENGER TIME 1920	BOTTOM 4974M	WIND	SPEED KT	WEATHER	DOMINANT WAVES
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	
2900B	10.23	34.465	1.63U					152.7	
3388		34.462	1.52						
3876	10.40	34.463	1.51					155.7	
4364		34.462	1.52						
4852		34.459	1.70U						

## RV ARGO

## CIRCE EXPEDITION II

16

	LATITUDE 7 40.0N	LONGITUDE 121 34.0E	MO/DAY/YR 04/22/68	MESSENGER TIME 1305	BOTTOM 4292M	WIND	SPEED KT	WEATHER	DOMINANT WAVES
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	
2226C	10.16	34.455	1.51					152.3	
2717	10.24	34.461	1.45					153.2	
3204	10.32	34.465	1.44					154.2	
3701	10.40	34.463	1.47					155.7	
4203	10.48	34.460	1.54					157.2	

## RV ARGO

## CIRCE EXPEDITION II

17

	LATITUDE 7 43.0N	LONGITUDE 119 35.0E	MO/DAY/YR 04/22/68	MESSENGER TIME 2342	BOTTOM 3677M	WIND	SPEED KT	WEATHER	DOMINANT WAVES
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	
1634D	10.10	34.450	1.56					151.7	
2097	10.14	34.468U	1.50						
2573	10.23	34.496U	1.43						
3054	10.29	34.459	1.44					154.1	
3547	10.37	34.457	1.48					155.6	

- A) THE DEPTHS ARE UNCERTAIN BECAUSE THE CAST WAS TAKEN WITH THE HEAT FLOW PROBE AND HAD ONLY ONE THERMOMETRIC DEPTH. THIS IS HEAT FLOW PROBE LOWERING FOUR (HF-4).
- B) THE DEPTHS ARE UNCERTAIN BECAUSE THE CAST WAS TAKEN WITH THE HEAT FLOW PROBE AND HAD ONLY ONE THERMOMETRIC DEPTH. THE DEPTHS HAVE BEEN COMPUTED USING THE CORRECTED PDR SOUNDING, THE DISTANCE BETWEEN THE BOTTOM AND THE PINGER, AND THE SPACING BETWEEN THE NANSSEN BOTTLES AND THE PINGER. THIS IS HEAT FLOW PROBE LOWERING SEVEN (HF-7).
- C) THE DEPTHS ARE UNCERTAIN BECAUSE THE CAST WAS TAKEN WITH THE HEAT FLOW PROBE. THIS IS HEAT FLOW PROBE LOWERING EIGHT (HF-8).
- D) THE DEPTHS ARE UNCERTAIN BECAUSE THE CAST WAS TAKEN WITH THE HEAT FLOW PROBE. THIS IS HEAT FLOW PROBE LOWERING NINE (HF-9).

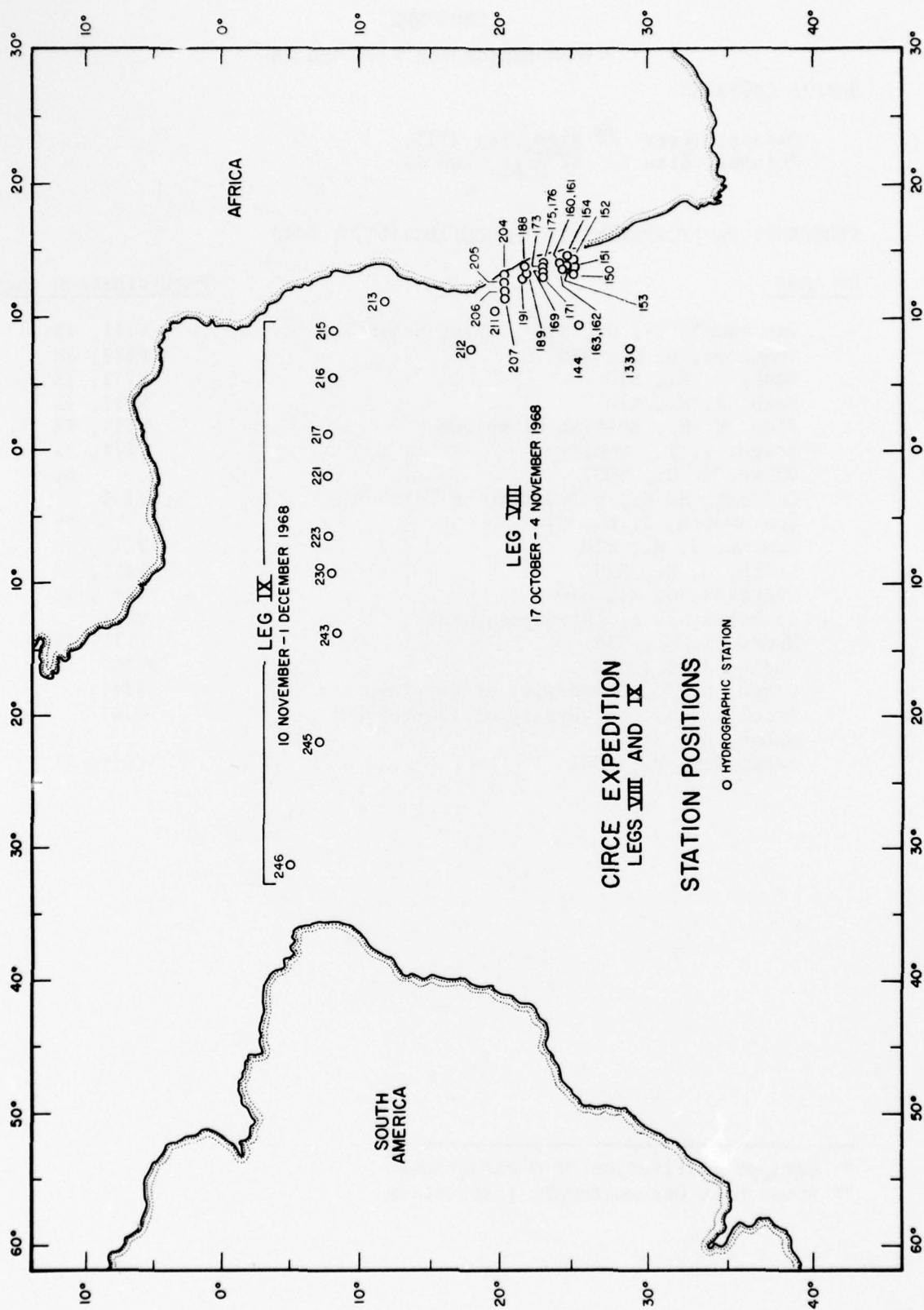


FIGURE 2

# PERSONNEL

## CIRCE Expedition VIII and IX

### SHIP'S CAPTAINS

Hansen, Terry RV Argo, Leg VIII  
Phinney, Alan W. RV Argo, Leg IX

### PERSONNEL PARTICIPATING IN THE COLLECTION OF DATA

#### RV ARGO

#### Participation (Leg)

van Andel, Tj. H., SIO*, Chief Scientist	VIII, IX
Anderson, G. C., SIO	VIII, IX
Bach, J. E., SIO	VIII, IX
Beer, R. M., SIO	VIII, IX
Blow, W. H., British Petroleum	VIII, IX
Bowen, V. T., WHOI**	VIII, IX
Burke, J. C., WHOI	IX
Calvert, S. E., University of Edinburgh	VIII
Coatsworth, J. L., SIO	IX
Edmond, J. M., SIO	VIII, IX
Heath, G. R., SIO	VIII, IX
Hohnhaus, G. W., SIO	VIII, IX
de Matos, J. E., Portuguese Navy	VIII
Moore, T. C., SIO	VIII, IX
Mudie, J. D., SIO	VIII
Orren, M. J., University of Capetown	VIII
Price, N. B., University of Edinburgh	VIII
Saban, D., SIO	IX
Schroeder, B., WHOI	VIII, IX

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\* Scripps Institution of Oceanography  
\*\* Woods Hole Oceanographic Institution



LATITUDE 28 31.15			LONGITUDE 7 33.8E		MO/DAY/YR 10/17/68		MESSENGER TIME 1814		BOTTOM 5063M	WIND 200	SPEED 12KT	WEATHER 2	DOMINANT WAVES 230 05		
Z	T	S	Q2	P04	S103	N02	N03	DT	Z	T	S	Q2	SIGT	DT	DD
0	17.49	35.64	5.74					210.6	0	17.49	35.64	5.74	25.905	210.6	0
48	17.34	35.65	5.84					206.4	10	17.46	35.63	5.76	25.909	210.2	.021
96	16.57 A	35.55	5.54					196.3	20	17.43	35.63	5.78	25.916	209.6	.042
145	15.63	35.42	5.59					185.2	30	17.40	35.64	5.80	25.925	208.7	.063
193	14.16	35.32	5.10					161.9	50	17.32	35.65	5.83	25.953	206.1	.105
241	13.14	35.16	5.37					153.5	75	16.95	35.60	5.67	26.005	201.1	.156
289	12.35	35.07	5.12					145.2	100	16.51	35.54	5.55	26.063	195.6	.206
338	11.55	35.00	4.96					135.8	125	16.06	35.47	5.58	26.116	190.5	.256
387	10.82	34.92	4.61					129.0	150	15.48	35.41	5.53	26.199	182.7	.303
483	8.98	34.71	4.73					114.8	200	13.99	35.30	5.13	26.436	160.2	.392
580	6.92	34.50	4.74					101.3	250	12.98	35.14	5.34	26.523	151.9	.473
677	5.46	34.39	4.70					91.6	300	12.17	35.05	5.09	26.617	143.0	.550
774	4.48	34.36	4.70					83.1	400	10.59	34.89	4.63	26.785	127.1	.693
871	3.99	34.37	4.54					77.5	500	8.60	34.67	4.73	26.941	112.3	.822
968	3.59	34.40	4.44					71.4	600	6.57	34.47	4.73	27.080	99.1	.937
1210	3.18	34.56	4.23					55.6	700	5.18	34.38	4.70	27.182	89.4	1.040
1453	3.03	34.69	4.46					44.4	800	4.32	34.36	4.66	27.266	81.5	1.133
1502B	3.04	34.73	4.54					41.5	1000	3.50	34.42	4.40	27.396	69.2	1.300
1662C	3.07								1200	3.19	34.55	4.23	27.533	56.2	1.442
1743B	3.03	34.80	4.79					36.1	1500	3.04	34.73	4.54	27.687	41.6	1.617
1984B	2.97	34.85	5.10					31.8	2000	2.97	34.85	5.12	27.792	31.6	1.862
2034C	2.96								2500	2.67	34.87	5.39	27.831	27.9	2.085
2225B	2.84	34.87	5.28					29.2	3000	2.45	34.87	5.46	27.851	26.0	2.301
2465B	2.71	34.87						28.1	3500	2.31	34.86	5.42	27.857	25.4	2.518
2497C	2.67								4000	1.78	34.81	5.19	27.857	25.5	2.727
2705B	2.57	34.87	5.43					27.0	4500	1.17	34.77	4.53	27.868	24.4	2.915
2944B	2.48	34.87	5.46					26.2							
2959C	2.46														
3180B	2.40	34.87						25.6							
3415B	2.33	34.86	5.43					25.8							
3647B	2.237	34.86						25.0							
3878B	1.979	34.82	5.30					26.1							
4167D	1.46	34.79	5.04					24.6							
4181D	1.43	34.78	5.11					25.2							
4415D	1.190														
4428D	1.18	34.77	4.64					24.3							
4657D	1.135	34.76	5.00U					24.8							
4681D	1.13	34.74	4.32					26.2							
4784D	1.15	34.74						26.4							

A) ALTERNATE VALUE, 16.45 DEGREES.

B) CAST IV. X-17-68, 2227 GMT.

C) CAST VII. X-18-68, 0110 GMT.

D) CAST IX. X-18-68, 1205 GMT.

LATITUDE 25 45.9S			LONGITUDE 9 26.4E		MO/DAY/YR 10/24/68		MESSENGER TIME 0305		BOTTOM 4676M	WIND 160	SPEED 16KT	WEATHER	DOMINANT WAVES 170 05 08		
Z	T	S	O2	PO4	SI03	NO2	NO3	OT	Z	T	S	O2	SIGT	DT	DD
0	17.24	35.535	5.85					212.5	0	17.24	35.535	5.85	25.885	212.5	0
49	16.12	35.454	5.92					193.3	10	16.98	35.515	5.86	25.933	208.0	.021
97	15.45	35.407	5.57					182.3	20	16.73	35.497	5.88	25.977	203.7	.042
103A	15.64 V	35.439V							30	16.50	35.480	5.89	26.018	199.8	.062
146	13.82	35.238	5.16					161.1	50	16.11	35.453	5.92	26.089	193.1	.101
194	12.71	35.088	5.20					150.6	75	15.79	35.435	5.76	26.149	187.5	.150
200A	12.55	35.091						147.3	100	15.36	35.397	5.54	26.217	181.0	.196
244	11.79	35.033	4.97					137.7	125	14.55	35.314	5.31	26.331	170.1	.241
292	10.86	34.929	5.06					129.0	150	13.72	35.219	5.16	26.433	160.5	.283
341	9.87	34.834	4.61					119.6	200	12.55	35.091	5.17	26.571	147.3	.363
391	8.90	34.702	4.75					114.2	250	11.68	35.021	4.99	26.685	136.5	.437
396A	9.11 V	34.725V							300	10.70	34.913	4.99	26.782	127.3	.506
488	7.10	34.536	4.28					101.0	400	8.73	34.683	4.72	26.933	113.0	.633
586	5.37	34.423	4.01					88.1	500	6.85	34.516	4.25	27.079	99.2	.747
588A	5.60 V	34.435							600	5.25	34.424	3.92	27.211	86.7	.847
604	4.81	34.447	3.49					80.1	700	4.70	34.443	3.51	27.290	79.2	.938
779A	4.34	34.454						74.6	800	4.29	34.459	3.63	27.348	73.7	1.022
782	4.34	34.451	3.60					74.9	1000	3.57	34.531	4.01	27.479	61.3	1.173
880	3.90	34.476	3.79					68.6	1200	3.37	34.650	4.22	27.592	50.6	1.302
970A	3.62	34.502						64.0	1500	3.29	34.825	4.78	27.740	36.6	1.464
978	3.59	34.511	3.99					63.0	2000	3.03	34.872	5.16	27.802	30.7	1.697
1159A	3.40	34.619						53.1	2500	2.79	34.887	5.49	27.836	27.5	1.919
1218	3.36	34.663	4.24					49.4	3000	2.51	34.892	5.53	27.865	24.8	2.134
1459	3.315	34.818	4.75					37.3	3500	2.35	34.869	5.45	27.861	25.2	2.349
1525B	3.27	34.828	4.79					36.2	4000	1.82	34.812	5.19	27.857	25.5	2.562
1812B	3.08	34.858	5.12					32.2	4500	1.16	34.733		27.841	27.0	2.759
2023B	3.03	34.874	5.16					30.6							
2274B	2.92	34.884	5.40					28.8							
2569B	2.75	34.890	5.50					26.9							
2811B	2.61	34.912	5.52					24.1							
3051B	2.49	34.886	5.53					25.1							
3292B	2.41	34.882						24.7							
3532B	2.339	34.868	5.44					25.2							
3775B	2.178	34.853						25.1							
3995C	1.83	34.813	5.19					25.5							
4020B	1.770	34.810	5.19					25.3							
4185C	1.48	34.775	5.22U					25.9							
4195C	1.46	34.778	5.09					25.5							
4372C	1.21	34.751	5.21U					25.9							
4382C	1.209	34.749	5.00					26.1							
4669B	1.112	34.711D						28.3							

A) CAST IX. X-24-68, 0553 GMT.

B) CAST III. X-23-68, 2255 GMT. NINE OXYGEN SAMPLES WERE COLLECTED FROM THE TWELVE NANSEN BOTTLES ON THIS CAST, BUT NO RECORD WAS MADE TO INDICATE THE LEVEL FROM WHICH THEY WERE DRAWN. INFORMATION FROM THE CAST SUMMARY SHEET AND THE DESIRED SAMPLE DEPTH SHEET WOULD SUGGEST THE ARRANGEMENT GIVEN.

C) CAST I. X-23-68, 1943 GMT

D) THE LAST SAMPLE BOTTLE OF THIS CAST CONTAINED MUD.

V) BECAUSE OF TIME DIFFERENCES, OVERLAPPING CASTS SHOW SOME DIFFERENCES. THIS SAMPLE HAS BEEN DELETED FOR THE INTERPOLATION.

RV ARGO

## CIRCE EXPEDITION VIII

150

LATITUDE 25 10.65			LONGITUDE 13 18.9E			MO/DAY/YR 10/25/68			MESSENGER TIME 2232			BOTTOM 1358M	WIND 170	SPEED 20KT	WEATHER	DOMINANT WAVES 160 11 10		
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD			
1	16.27	35.232		.64	0.0	.11	3.4	212.8	0	16.27	35.232		25.882	212.8	0			
49	15.97	35.217	5.85	.55	0.0	.19	4.1	207.3	10	16.21	35.229		25.893	211.8	.021			
96	13.18	35.142	4.60	1.05	1.5	.03	12.8	155.6	20	16.15	35.226		25.905	210.7	.042			
112A	12.93	35.118						152.5	30	16.09	35.223		25.916	209.5	.064			
143	12.25	35.068	4.34	.68	2.0	.01	16.0	143.5	50	15.91	35.215	5.81	25.952	206.2	.105			
190	11.38	34.991	3.86	.91	5.9	.01	17.0	133.5	75	14.39	35.169	5.04	26.253	177.6	.154			
202A	11.09	34.956						131.0	100	13.10	35.136	4.56	26.496	154.5	.196			
239	10.30	34.877	3.50	2.18	7.8	.02	22.1	123.4	125	12.66	35.097	4.39	26.555	148.9	.235			
286	9.58	34.810	2.79	2.39	10.5	.01	27.5	116.7	150	12.13	35.060	4.27	26.630	141.8	.272			
287A	9.79	34.838V							200	11.14	34.962	3.80	26.739	131.4	.342			
334	8.66	34.711	2.97	2.86	11.4	.00	29.0	109.9	250	10.13	34.861	3.31	26.842	121.7	.408			
380A	7.98	34.652						104.4	300	9.31	34.780	2.84	26.916	114.7	.470			
383	7.84	34.633	2.97	3.10	12.4	.02	31.7	103.8	400	7.52	34.606	2.85	27.055	101.5	.585			
474A	6.61	34.582						91.1	500	6.30	34.541	2.31	27.172	90.3	.688			
477	6.51	34.556	2.30	2.92	18.6	.01	37.1	91.8	600	5.49	34.496	2.67	27.239	84.0	.782			
573A	5.89	34.540							700	4.79	34.467	3.01	27.298	78.4	.871			
574B	5.74	34.514						85.6	800	4.37	34.470	3.45	27.347	73.8	.955			
577	5.65	34.546U	2.58	2.76	23.0	.01	39.2		1000	3.76	34.525	3.86	27.454	63.6	1.109			
649B	5.16	34.482	2.84	2.56	25.9	.00	36.9	81.3	1200	3.42	34.670	3.85	27.604	49.5	1.240			
666B	5.08	34.483						80.3										
674	4.99	34.478	2.87	2.72	24.8	.01	37.8	79.7										
676A	5.14	34.488																
760B	4.52	34.464	3.38	2.68	29.5	.00	37.2	75.7										
780B	4.43	34.469						74.4										
857B	4.22	34.472	3.50	2.83	30.4	.00	36.0	72.1										
905B	4.04	34.488						69.1										
1047B	3.66	34.548	3.96	2.57	36.9	.00	33.2	60.9										
1193B	3.43	34.656	3.89					50.6										

RV ARGO

## CIRCE EXPEDITION VIII

151

LATITUDE 25 10.05			LONGITUDE 14 03.2E			MO/DAY/YR 10/26/68			MESSENGER TIME 0742			BOTTOM 187M	WIND 180	SPEED 16KT	WEATHER 0	DOMINANT WAVES 010 06 08		
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD			
1	13.16	34.926	6.48	.46	0.0	.24	7.1	171.0	0	13.16	34.926	6.48	26.322	171.0	0			
30	13.10	34.936						169.1	10	13.14	34.931	6.47	26.330	170.2	.017			
35	13.07	34.930	6.44	.49	0.0	.28	7.2	169.0	20	13.12	34.935	6.46	26.337	169.6	.034			
70	11.92	34.955						145.7	30	13.10	34.936	6.45	26.342	169.1	.051			
75	11.66	34.946	4.62	1.42	8.8	.25	18.6	141.7	50	12.75	34.943	5.87	26.417	161.9	.084			
115	11.25	34.994	2.82	1.93	10.5	.02	24.1	131.0	75	11.66	34.946	4.62	26.630	141.7	.123			
125	11.09	34.980						129.2	100	11.40	34.976	3.44	26.701	135.0	.158			
149	10.81	34.956						126.2	125	11.09	34.980	2.51	26.762	129.2	.192			
153	10.80	34.949	1.92	2.35	20.3	.03	24.4	126.5	150	10.81	34.954	1.96	26.794	126.2	.224			
176	10.75	34.946						125.9										
180	10.75	34.949	1.77	2.08	23.4	.06	25.5	125.7										

RV ARGO

## CIRCE EXPEDITION VIII

152

LATITUDE 25 09.95			LONGITUDE 14 15.2E			MO/DAY/YR 10/26/68			MESSENGER TIME 0924			BOTTOM 170M	WIND 180	SPEED 18KT	WEATHER 0	DOMINANT WAVES 010 06 09		
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD			
1	13.27	34.967	6.18	.72	0.0	.38	7.3	170.1	0	13.27	34.967	6.18	26.331	170.1	0			
31	13.07	34.963						166.6	10	13.18	34.959	6.18	26.342	169.1	.017			
37	13.06	34.955	6.19	.64	1.1	.40	8.3	167.0	20	13.11	34.957	6.19	26.355	167.9	.034			
70	11.55	34.954						139.2	30	13.07	34.962	6.19	26.367	166.7	.051			
80	11.37	34.943	4.47	1.30	8.2	.04	19.2	136.8	50	12.53	34.951	5.77	26.467	157.2	.083			
114	10.95	34.949	3.06	1.75	17.7	.02	24.0	129.1	75	11.45	34.948	4.72	26.672	137.8	.121			
125	10.89	34.945						128.3	100	11.08	34.944	3.63	26.736	131.7	.155			
152	10.56	34.920						124.6	125	10.89	34.945	2.67	26.772	128.3	.188			
165	10.56	34.921	1.49		36.6	.18	27.7	124.5	150	10.58	34.921	1.88	26.809	124.8	.220			

A) CAST IV. X-26-68, 0134 GMT.

B) CAST II. X-26-68, 0002 GMT.

V) BECAUSE OF TIME DIFFERENCES, OVERLAPPING CASTS SHOW SOME DIFFERENCES. THIS SAMPLE HAS BEEN DELETED FOR THE INTERPOLATION.

RV ARGO									CIRCE EXPEDITION VIII										153
LATITUDE 25 09.55			LONGITUDE 14 26.8E			MO/DAY/YR 10/26/68		MESSENGER TIME 1055	BOTTOM 131M	WIND 180	SPEED 17KT	WEATHER 0	DOMINANT WAVES 010 06 08						
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD				
1	12.34	34.951	5.95	1.44	1.7	.62	11.3	153.7	0	12.34	34.951	5.95	26.504	153.7	0				
28	12.05	34.943						149.0	10	12.25	34.945	5.77	26.517	152.5	.015				
38	11.93	34.947	5.14	1.53	6.4	.70	15.4	146.1	20	12.14	34.942	5.56	26.536	150.7	.031				
57	11.63	34.945						141.3	30	12.03	34.944	5.33	26.559	148.5	.046				
68	11.29	34.939	4.36	1.42	7.8	.06	19.1	135.7	50	11.77	34.947	4.88	26.611	143.6	.075				
82	11.10	34.921						133.7	75	11.18	34.929	4.00	26.707	134.5	.110				
106	10.57	34.905	2.34	1.75	26.8	.06	25.2	125.9	100	10.68	34.905	2.67	26.778	127.7	.143				
123	10.59	34.924						124.8	125	10.59	34.921	1.67	26.807	125.0	.176				
128	10.59	34.917	1.58	1.74	32.4	.12	26.1	125.3											

RV ARGO				CIRCE EXPEDITION VIII												154
LATITUDE 25 09.45		LONGITUDE 14 37.6E		MO/DAY/YR 10/26/68		MESSENGER TIME 1221		BOTTOM 80M	WIND 190	SPEED 23KT	WEATHER 0	DOMINANT WAVES				
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD	
0	11.25	34.902	4.20	1.49	21.9	.23	22.2	137.7	0	11.25	34.902	4.20	26.673	137.7	0	
12	11.01	34.910	4.15	1.72	24.1	.22	21.5	133.0	10	11.04	34.908	4.16	26.716	133.6	.014	
37	10.83	34.916						129.5	20	10.95	34.911	3.93	26.735	131.9	.027	
43	10.83	34.901	3.35	1.69	26.5	.20	23.7	130.6	30	10.88	34.913	3.67	26.749	130.4	.040	
53	10.81	34.898	3.36	1.59	25.7	.16	23.2	130.4	50	10.82	34.898	3.36	26.749	130.5	.066	
58	10.80	34.902						130.0	75	10.60	34.909	1.98	26.796	126.1	.099	
66	10.64		2.30	1.75	32.2	.20	24.8									
71	10.61	34.910						126.2								
75	10.60	34.909	1.98	1.77	35.8	.21	25.0	126.1								

RV ARGO										CIRCE EXPEDITION VIII										160
LATITUDE 24 13.55		LONGITUDE 14 15.5E		MO/DAY/YR 10/27/68		MESSENGER TIME 0605		BOTTOM 112M		WIND 170		SPEED 12KT		WEATHER 0		DOMINANT WAVES 210 08				
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD					
1	12.45	34.942	6.00	.71	1.2	.31	11.1	156.4	0	12.45	34.942	6.00	26.476	156.4	0					
11	12.41	34.941	5.98	.97	1.9	.31	10.9	155.8	10	12.41	34.941	5.98	26.482	155.8	.016					
15	12.43	34.940						156.2	20	12.42	34.944	5.95	26.482	155.8	.031					
30	12.41	34.951	5.91	1.16	2.4	.30	11.2	155.0	30	12.41	34.951	5.91	26.490	155.0	.047					
40	12.20	34.953						151.0	50	11.88	34.965	4.47	26.604	144.3	.077					
69	11.30	34.981	2.82	1.41	11.8	.14	19.4	132.8	75	11.19	34.977	2.45	26.741	131.3	.112					
78	11.15	34.974						130.7	100	11.01	34.966	1.71	26.767	128.8	.145					
93	11.00	34.967	1.71	1.87	32.8	.19	22.6	128.6												
102	11.01	34.966						128.9												
107	11.02	34.966	1.71	1.87	32.1	.19	22.6	129.0												

RV ARGO				CIRCE EXPEDITION VIII										161			
LATITUDE 24 13.5S		LONGITUDE 14 05.4E		MO/DAY/YR 10/27/68		MESSENGER TIME 0900		BOTTOM 297M		WIND 180		SPEED 17KT		WEATHER 0		DOMINANT WAVES 170 07 10	
Z	T	S	O2	PO4	SI03	NO2	NO3	DT									
0	13.08	34.927	6.34	.53	0.5	.35	8.5	169.4									
28	12.98	34.936	6.34	.47	2.4	.35	8.8	166.8									
145A	10.61	34.936						124.2									
150A	10.59	34.934	1.43	2.05	21.6	.15	26.7	124.1									

A) CAST II. X-27-68, 0915 GMT.



## 162

	LATITUDE		LONGITUDE		MO/DAY/YR		MESSENGER		TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES		
	24 15.15		13 51.5E		10/27/68		11C0			255M	180	17KT	0	170 07 10		
Z	T	S	O2	P04	S103	N02	N03	DT	Z	T	S	O2	S1GT	DT	DO	
0	14.21	34.974	6.21	1.13	1.2	.37	7.8	188.2	0	14.21	34.974	6.21	26.141	188.2	0	
37	13.92	34.981	6.13	1.49	2.7	.27	7.5	181.9	10	14.13	34.976	6.19	26.159	186.5	.019	
58	13.18	35.034						163.5	20	14.05	34.978	6.17	26.177	184.8	.037	
77	12.43	35.023	4.45	1.33	7.7	.26	17.0	150.1	30	13.97	34.979	6.15	26.195	183.1	.056	
105	11.86	35.043						138.2	50	13.49	35.015	5.61	26.323	170.9	.091	
115	11.78	35.035	3.98	1.46	11.3	.01	20.3	137.3	75	12.50	35.025	4.54	26.529	151.3	.132	
142	11.32	35.000						131.7	100	11.92	35.040	4.10	26.654	139.5	.169	
161	11.05	34.962	3.46	1.76	9.4	.01	20.1	129.8	125	11.63	35.024	3.86	26.698	135.3	.204	
180	10.73	34.932						126.6	150	11.21	34.984	3.57	26.744	130.9	.238	
199	10.36	34.894	3.15	1.95	12.5	.01	23.0	123.2	200	10.34	34.892	3.13	26.828	123.0	.304	
209	10.19	34.884						121.1	250	9.62	34.846	2.02	26.915	114.7	.366	
228	9.76	34.841	2.39	1.97	15.6	.00	27.0	117.3								
248	9.63	34.848						114.7								
252	9.62	34.844	1.99	2.60	20.2	.03	29.9	114.8								

## 163

	LATITUDE 24 14.2S	LONGITUDE 13 41.6E	MO/DAY/YR 10/28/68	MESSENGER 1307	TIME	BOTTOM 294M	WIND 170	SPEED 21KT	WEATHER 0	DOMINANT WAVES 170 08 10					
Z	T	S	O2	P04	S103	N02	N03	DT	Z	T	S	O2	SIGT	DT	DD
0	14.47	34.975	6.21	1.23	1.3	.21	7.0	193.4	0	14.47	34.975	6.21	26.086	193.4	0
39	14.25	34.971	6.26	.64	1.6	.22	6.3	189.2	10	14.40	34.973	6.22	26.100	192.1	.019
58	14.21	34.974						188.2	20	14.33	34.971	6.24	26.112	190.9	.038
77	13.77	35.088	5.32	1.05	4.3	.20	11.2	171.1	30	14.28	34.971	6.25	26.122	189.9	.058
106	12.84	35.114						151.1	50	14.23	34.973	6.05	26.136	188.6	.096
115	12.61	35.102	4.24	1.16	6.7	.01	15.7	147.7	75	13.83	35.075	5.38	26.299	173.2	.141
144	12.03	35.076						138.8	100	13.03	35.120	4.63	26.497	154.4	.183
163	11.58	35.018	3.95	1.38	8.1	.02	17.9	135.0	125	12.40	35.096	4.17	26.604	144.2	.221
181	11.31	35.001						131.5	150	11.88	35.057	4.02	26.675	137.5	.257
201	11.05	34.974	3.02	2.05	12.7	.02	20.6	129.0	200	11.07	34.975	3.04	26.763	129.1	.326
210	10.81	34.962						125.7	250	10.03	34.875	2.32	26.869	119.1	.391
229	10.35	34.900	2.73	1.97	14.4	.01	25.7	122.6							
249	10.05	34.878						119.2							
268	9.73	34.847	2.02	2.42	18.9	.00	27.8	116.4							
274	9.69	34.843						116.0							
278	9.68	34.844	1.96	2.44	19.5	.01	29.1	115.8							

## 171

	LATITUDE 23 02.6S		LONGITUDE 13 07.1E		MO/DAY/YR 10/28/68		MESSENGER TIME 1338		BOTTOM 340M	WIND 170	SPEED 23KT	WEATHER 2	DOMINANT WAVES 160 12 13		
Z	T	S	O2	P04	SIO3	N02	N03	DT	Z	T	S	O2	SIGT	DT	DO
0	14.94	35.089	5.79	.50	0.0	.25	8.3	194.8	0	14.94	35.089	5.79	26.072	194.8	0
28	14.94	35.077	5.80	.48	0.0	.25	8.5	195.6	10	14.94	35.085	5.79	26.068	195.1	.020
56	14.74	35.290	5.16	.77	0.0	.25	9.2	175.9	20	14.94	35.080	5.80	26.065	195.4	.039
74	14.06	35.240	4.79	.75	0.0	.06	10.9	165.7	30	14.93	35.088	5.76	26.075	194.5	.059
79	13.92	35.225						164.0	50	14.78	35.235	5.32	26.219	180.8	.096
97	13.62	35.200	4.52	.85	0.0	.04	12.5	159.9	75	14.03	35.237	4.78	26.382	165.3	.180
138	12.76	35.145	3.73	1.19	1.7	.03	16.7	147.3	100	13.57	35.196	4.47	26.446	159.2	.141
148	12.46	35.132						142.6	125	13.08	35.162	4.01	26.521	152.1	.221
185	11.98	35.091	2.56	1.56	4.9	.02	23.1	136.8	150	12.43	35.131	3.40	26.625	142.2	.259
190	11.84	35.079						135.2	200	11.63	35.055	2.51	26.722	133.1	.330
232	11.06	34.988	2.39	1.91	5.9	.00	25.9	128.1	250	10.70	34.953	2.27	26.813	124.4	.397
237	10.96	34.979						127.0	300	9.91	34.872	1.80	26.888	117.3	.460
276	10.23	34.906	2.06	9.8	.03	29.0	120.1								
319	9.75	34.856						116.0							
324	9.73	34.854	1.49	2.24	14.0	.07	31.0	115.8							

## 173

LATITUDE 22 59.55		LONGITUDE 13 41.0E		MO/DAY/YR 10/28/68		MESSENGER TIME 1707		BOTTOM 153M		WIND 190		SPEED 15KT		WEATHER 1		DOMINANT WAVES 180 10	
Z	T	S	O2	P04	S103	NC2	NO3	DT	Z	T	S	O2	SIGT	DT	DO		
0	13.63	35.03	5.69	1.16	0.0	.20	10.4	172.5	0	13.63	35.03	5.69	26.306	172.5	0		
24	13.60	35.02	5.63	1.21	0.0	.21	10.4	172.7	10	13.62	35.03	5.66	26.305	172.6	.017		
38	13.58	35.04	5.63	.76	0.0	.23	10.0	170.8	20	13.61	35.02	5.63	26.305	172.7	.035		
57	13.02	35.08	4.40	1.39	1.8	1.8	15.8	157.0	30	13.59	35.03	5.63	26.313	171.9	.052		
66	12.57	35.09						147.8	50	13.29	35.07	4.93	26.403	163.3	.086		
84	12.02	35.08	2.92	1.78	8.8	.09	20.6	138.4	75	12.24	35.09	3.37	26.635	141.3	.124		
89	11.95	35.06						138.6	100	11.77	35.06	2.27	26.696	135.6	.159		
107	11.67	35.06	2.06	2.52	14.8	.13	24.1	133.5	125	11.60	35.04	1.78	26.714	133.8	.194		
116	11.61	35.04						133.9									
132	11.60	35.04	1.75	2.27	14.9	.17	24.6	133.7									
137	11.60	35.04						133.7									
140	11.60	35.04	1.74	3.14	10.7	.15	24.4	133.7									

## RV ARGO

## CIRCE EXPEDITION VIII

175

LATITUDE 22 56.4S LONGITUDE 13 59.6E MO/DAY/YR 10/28/68 MESSENGER TIME 1936										BOTTOM 134M	WIND 190	SPEED 16KT	WEATHER	DOMINANT WAVES		
Z	T	S	O2	PO4	SI03	NO2	NO3	DT		Z	T	S	O2	SIGT	DT	DD
0	12.97	35.021	5.03	1.36	12.7	.32	18.6	160.4		0	12.97	35.021	5.03	26.434	160.4	0
29	12.41	35.064	3.53	1.61	7.9	.14	19.4	146.7		10	12.72	35.036	4.41	26.495	154.6	.016
39	12.33	35.078		1.71	5.6	.14	19.7	144.2		20	12.53	35.051	3.89	26.544	149.9	.031
43	12.19	35.084						141.2		30	12.40	35.063	3.51	26.579	146.6	.046
53	12.04	35.072	3.01	1.81	6.5	.12	21.3	139.3		50	12.07	35.072	3.07	26.650	139.9	.075
67	11.82	35.062						136.1		75	11.61	35.039	2.18	26.713	133.9	.109
76	11.58	35.036	2.14	1.90	13.1	.20	25.0	133.7		100	11.36	35.033	1.01	26.754	130.0	.143
90	11.44	35.037						131.1								
100	11.36	35.033	1.01	2.27	22.0	.16	25.7	130.0								
117	11.23	35.017						128.9								
120	11.23	35.015	.96	2.67	29.0	.36	26.7	129.1								
122	11.22	35.022	.97	2.64	30.0	.35	25.0	128.4								

## RV ARGO

## CIRCE EXPEDITION VIII

176

LATITUDE 22 57.0S LONGITUDE 14 13.9E MO/DAY/YR 10/28/68 MESSENGER TIME 2352										BOTTOM 127M WIND 160 SPEED 18KT WEATHER DOMINANT WAVES						
Z	T	S	O2	PO4	SI03	NO2	NO3	DT		Z	T	S	O2	SIGT	DT	DD
0	12.75	35.029	4.77	1.39	11.8	.09	19.9	155.7		0	12.75	35.029	4.77	26.484	155.7	0
24	12.32	35.11 A	3.41	1.54	4.4	.21	18.8	141.7		10	12.59	35.089	4.15	26.562	148.2	.015
33	12.12	35.085						139.8		20	12.40	35.111	3.61	26.616	143.1	.030
44	11.99	35.072	2.61	1.65	7.1	.15	19.4	138.4		30	12.18	35.094	3.13	26.645	140.3	.044
58	11.83	35.071						135.6		50	11.93	35.072	2.51	26.678	137.3	.072
68	11.67	35.057	2.19	1.90	6.0	.16	20.6	133.7		75	11.51	35.042	1.82	26.734	131.9	.106
86	11.29	35.024						129.4		100	11.25	35.025	.62	26.768	128.7	.139
100	11.25	35.025	.62	2.38	23.6	.30	22.0	128.7								
110	11.25	35.021						129.0								
114	11.25	35.045	.49	2.31	26.8	.04	20.1	127.2								

## RV ARGO

## CIRCE EXPEDITION VIII

188

LATITUDE 21 51.5S LONGITUDE 13 46.8E MO/DAY/YR 10/29/68 MESSENGER TIME 1022									BOTTOM 93M WIND 150 SPEED 13KT WEATHER DOMINANT WAVES 180 04 10							
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD	
0	13.75	35.084	6.75	.18	0.0	.01	0.0	171.0	0	13.75	35.084	6.75	26.323	171.0	0	
10	13.65	35.069	6.27	.32	0.0	.03	0.9	170.1	10	13.65	35.069	6.27	26.332	170.1	.017	
29	12.40	35.103						143.7	20	12.99	35.082	4.28	26.477	156.3	.033	
34	12.31	35.107	1.46	1.97	18.5	.10	24.6	141.7	30	12.38	35.104	2.27	26.615	143.2	.048	
53	11.96	35.101	1.16	2.01	19.6	.39	21.8	135.7	50	12.00	35.102	1.21	26.687	136.4	.077	
63	11.93	35.105						134.9	75	11.81	35.096	.02	26.718	133.4	.111	
73	11.82	35.099	.02	2.53	46.0	2.23	8.5	133.3								
88	11.77	35.081						133.8								
93	11.78	35.084	.01	2.97	45.2	3.24	7.4	133.7								

## RV ARGO

## CIRCE EXPEDITION VIII

189

LATITUDE 21 52.4S										LONGITUDE 13 36.0E		MO/DAY/YR 10/30/68		MESSENGER TIME 0020		BOTTOM 132M	WIND 170	SPEED 13KT	WEATHER	DOMINANT WAVES 050 04 11		
Z	T	S	O2	PO4	SI03	NO2	NO3	DT		Z	T	S	O2	SIGT	DT	DD						
0	14.11	35.077	7.04	.02	0.0	.04	0.0	178.6		0	14.11	35.077	7.04	26.241	178.6							
26	13.74	35.089	6.11	.44	0.0	.08	3.1	170.4		10	14.04	35.104	6.85	26.277	175.2					.018		
31	13.60	35.070						169.0		20	13.88	35.103	6.45	26.310	172.1					.035		
36	13.51	35.075	5.38	.42	0.0	.10	7.7	166.9		30	13.63	35.073	5.82	26.340	169.3					.052		
55	13.23	35.064	4.52	.99	2.2	.18	13.6	162.3		50	13.31	35.065	4.73	26.397	163.8					.086		
65	12.95		3.89	1.14	5.7	.19	19.4			75	12.36	35.078	2.14	26.598	144.8					.125		
69	12.61	35.065						150.4		100	11.65	35.070	.67	26.728	132.5					.160		
74	12.40	35.074	2.28	1.17	6.2	.20	22.6	145.8														
84	12.03	35.098	1.20	2.14	18.5	.13	25.2	137.2														
89	11.84	35.084						134.8														
103	11.64	35.069	.57	2.03	25.0	.02	26.2	132.3														
111	11.61	35.066	.58	2.29	37.3	.06	26.2	132.0														
116	11.61	35.069						131.8														
121	11.61	35.067	.60	2.31	37.9	.11	25.7	131.9														

A) THIS SAMPLE BOTTLE WAS BROKEN AT THE TOP. THE VALUE HAS BEEN ACCEPTED ALTHOUGH EVAPORATION WAS POSSIBLE.

## RV ARGO

## CIRCE EXPEDITION VIII

191

LATITUDE 21 53.35 LONGITUDE 13 11.8E MO/DAY/YR 10/30/68 MESSENGER TIME 0330 BOTTOM 173M WIND 100 SPEED 14KT WEATHER 02 SIGT DT DD										DOMINANT WAVES 140 06 10									
Z	T	S	O2	P04	S103	N02	N03	DT	Z	T	S	O2	SIGT	DT	DD				
0	14.73	35.094	5.73	.47	0.0	.13	6.2	190.0	0	14.73	35.094	5.73	26.122	190.0	0				
27	14.16	35.147	4.99	.82	1.6	.17	10.6	174.5	10	14.61	35.104	5.44	26.154	186.9	.019				
37	13.74	35.189						163.1	20	14.39	35.125	5.17	26.220	180.7	.037				
56	13.55	35.187	4.32	1.07	3.1	.14	14.4	159.5	30	14.03	35.160	4.92	26.323	170.9	.055				
66	13.29	35.195						153.8	50	13.59	35.182	4.46	26.432	160.6	.088				
85	12.88	35.153	3.58	1.13	4.6	.05	17.6	149.0	75	13.08	35.177	3.84	26.532	151.1	.128				
104	12.63	35.155	3.11	1.29	4.8	.08	18.1	144.1	100	12.68	35.154	3.21	26.594	145.2	.165				
127	12.19	35.123						138.3	125	12.23	35.127	2.69	26.662	138.8	.202				
145	11.84	35.074	2.27	1.93	8.6	.07	23.2	135.5	150	11.77	35.073	2.14	26.708	134.3	.237				
155	11.72	35.073						133.5											
158	11.71	35.071	1.93	1.79	11.2	.08	24.0	133.4											

## RV ARGO

## CIRCE EXPEDITION VIII

204

LATITUDE 20 19.95 LONGITUDE 13 01.8E MO/DAY/YR 10/31/68 MESSENGER TIME 0233 BOTTOM 117M WIND 160 SPEED 17KT WEATHER 02 SIGT DT DD										DOMINANT WAVES 160 04									
Z	T	S	O2	P04	S103	N02	N03	DT	Z	T	S	O2	SIGT	DT	DD				
0	13.81	35.112	5.38	1.02	3.3	.41	11.6	170.1	0	13.81	35.112	5.38	26.332	170.1	0				
10	13.75	35.115	5.35	.96	3.5	.47	11.8	168.7	10	13.75	35.115	5.35	26.346	168.7	.017				
29	13.54	35.109	4.85	1.23	7.2	.47	13.8	165.0	20	13.64	35.112	5.09	26.367	166.7	.034				
34	13.22	35.114						158.4	30	13.48	35.110	4.73	26.400	163.6	.050				
39	13.02	35.11	3.71	1.54	13.0	.56	19.4	154.8	50	12.96	35.106	3.58	26.502	153.9	.082				
58	12.91	35.104	3.49	2.01	13.2	.53	19.5	153.2	75	12.77	35.109	3.15	26.542	150.2	.121				
68	12.85	35.103						152.1	100	12.13	35.117	1.53	26.673	137.7	.157				
77	12.74	35.111	3.08	1.06	14.8	1.06	21.4	149.4											
100	12.13	35.117						137.7											
104	12.13	35.119	1.14	2.46	21.0	2.46	26.3	137.5											

## RV ARGO

## CIRCE EXPEDITION VIII

205

LATITUDE 20 22.25 LONGITUDE 12 51.4E MO/DAY/YR 10/31/68 MESSENGER TIME 0405 BOTTOM 138M WIND 150 SPEED 14KT WEATHER 02 SIGT DT DD										DOMINANT WAVES 160 04 10									
Z	T	S	O2	P04	S103	N02	N03	DT	Z	T	S	O2	SIGT	DT	DD				
0	13.74	35.12	5.37	1.06	5.5	.40	13.0	168.1	0	13.74	35.12	5.37	26.352	168.1	0				
29	13.67	35.12	5.18	1.17	4.7	.43	12.1	166.7	10	13.72	35.12	5.34	26.357	167.6	.017				
43	13.57	35.117	4.96	1.40	5.8	.42	14.6	165.0	20	13.69	35.12	5.28	26.362	167.2	.034				
58	13.54	35.22 U	4.92	1.17	7.1	.42	14.6		30	13.66	35.12	5.16	26.368	166.6	.050				
62	13.54	35.119						164.3	50	13.56	35.12	4.93	26.389	164.7	.084				
77	13.48	35.123	4.74	1.14	6.9	.41	14.6	162.8	75	13.49	35.12	4.76	26.405	163.1	.125				
82	13.47	35.14						161.3	100	12.98	35.16	3.00	26.538	150.5	.165				
105	12.77	35.156	2.55	1.73	9.1	.20	21.6	146.7	125	12.18	35.13	1.42	26.672	137.8	.202				
112	12.51	35.151						142.2											
123	12.18	35.13						137.6											
127	12.18	35.12	1.33	2.12	16.1	.33	26.6	138.4											

## RV ARGO

## CIRCE EXPEDITION VIII

206

LATITUDE 20 24.05 LONGITUDE 12 39.1E MO/DAY/YR 10/31/68 MESSENGER TIME 0547 BOTTOM 198M WIND 160 SPEED 20KT WEATHER 2 SIGT DT DD										DOMINANT WAVES									
Z	T	S	O2	P04	S103	N02	N03	DT	Z	T	S	O2	SIGT	DT	DD				
0	14.98	35.117	6.11	.94	0.0	.14	3.7	193.5	0	14.98	35.117	6.11	26.085	193.5	0				
29	14.90	35.191	5.71	.86	0.0	.16	6.3	186.5	10	14.95	35.134	6.03	26.104	191.7	.019				
58	14.44	35.232	4.76	1.17	0.9	.21	12.7	174.0	20	14.92	35.160	5.89	26.130	189.2	.038				
68	14.21	35.257						167.5	30	14.89	35.192	5.68	26.162	186.2	.057				
87	13.50	35.218	3.55	1.41	4.2	.01	18.9	156.2	50	14.60	35.220	5.06	26.246	178.2	.094				
111	12.59	35.169						142.4	75	13.97	35.249	4.10	26.404	163.2	.137				
116	12.51	35.161	1.73	1.91	12.1	.00	22.6	141.4	100	12.95	35.190	2.81	26.567	147.7	.176				
140	12.24	35.139						138.1	125	12.39	35.149		26.649	140.0	.213				



## RV ARGO

## CIRCE EXPEDITION VIII

207

LATITUDE 20 24.8S		LONGITUDE 12 28.0E		MO/DAY/YR 10/31/68		MESSENGER TIME 0725		BOTTOM 268M		WIND 160		SPEED 20KT		WEATHER 1		DOMINANT WAVES 150 04 10	
Z	T	S	O2	P04	S103	N02	N03	DT	Z	T	S	O2	SIGT	DT	DD		
0	15.09	35.181	6.21	.81	0.0	.22	4.6	191.2	0	15.09	35.181	6.21	26.110	191.2	0		
39	14.95	35.191	5.79	.90	0.0	.25	5.6	187.5	10	15.05	35.183	6.10	26.119	190.2	.019		
58	14.48	35.254						173.2	20	15.02	35.186	5.99	26.129	189.3	.038		
77	13.95	35.243	3.94	1.57	4.8	.07	17.4	163.3	30	14.98	35.188	5.89	26.139	188.4	.057		
106	13.34	35.215						153.3	50	14.70	35.229	5.29	26.233	179.5	.094		
116	13.24	35.207	2.81	1.74	7.9	.08	23.3	152.0	75	14.00	35.246	4.05	26.394	164.2	.137		
144	12.90	35.197						146.2	100	13.44	35.221	3.21	26.493	154.7	.178		
163	12.58	35.25 U	1.76	1.98	12.7	.03	27.4	137.2	125	13.14	35.204	2.58	26.540	150.3	.217		
182	12.14	35.126						137.2	150	12.81	35.195	2.01	26.601	144.6	.255		
211	11.91	35.102						134.7	200	11.98	35.107	1.43	26.695	135.6	.327		
230	11.63	35.076	1.14	2.15	17.2	.02	27.4	131.6	250	11.39	35.050	.79	26.762	129.3	.396		
239	11.41	35.050	.96	2.21	23.5	.09	29.7	129.6									
250	11.39	35.050						129.3									
255	11.39	35.068	.73	2.47	24.6	.11	28.4	128.0									

## RV ARGO

## CIRCE EXPEDITION VIII

211

LATITUDE 19 58.1S		LONGITUDE 10 42.3E		MO/DAY/YR 10/31/68		MESSENGER TIME 2310		BOTTOM 1390M		WIND 160		SPEED 16KT		WEATHER		DOMINANT WAVES	
Z	T	S	O2	P04	S103	N02	N03	DT	Z	T	S	O2	SIGT	DT	DD		
0	16.15	35.279	5.77	1.04	0.0	.27	9.6	206.8	0	16.15	35.279	5.77	25.946	206.8	0		
49	15.58	35.315	5.43	1.08	0.0	.55	19.4	191.8	10	16.03	35.265	5.70	25.961	205.2	.021		
96	13.94	35.291	3.94	1.75	7.2	.05	23.0	159.6	20	15.92	35.262	5.63	25.986	202.9	.041		
146	13.35	35.269	2.52	1.83	9.0	.03	26.5	149.5	30	15.80	35.269	5.56	26.018	199.8	.061		
195	12.25	35.158	1.28	1.79	9.3	.04	30.0	136.8	50	15.55	35.314	5.40	26.111	191.1	.101		
217A	11.56	35.077						130.3	75	14.67	35.302	4.67	26.294	173.7	.147		
244	11.09	35.036	1.09	1.99	12.3	.02	32.2	125.1	100	13.88	35.291	3.82	26.455	158.4	.189		
293	10.52	34.972	.93	2.13	14.3	.00	38.5	120.1	125	13.56	35.285	3.10	26.518	152.4	.228		
343	9.53	34.864	.88	2.19	14.9	.00	39.2	111.9	150	13.28	35.263	2.40	26.558	148.6	.267		
392	8.91	34.806	1.03	2.21	16.5	.00	40.8	106.6	200	12.09	35.138	1.26	26.698	135.3	.340		
488	7.46	34.686	1.52	2.46	19.4	.00	39.6	94.6	250	11.02	35.029	1.07	26.813	124.4	.408		
591	6.19	34.585	1.95	2.55	23.9	.00	42.8	85.7	300	10.38	34.956	.92	26.871	118.9	.472		
658A	5.55	34.514						83.3	400	8.79	34.795	1.07	27.011	105.6	.592		
689	5.34	34.527	2.44	2.41	28.9	.00	41.5	79.9	500	7.30	34.674	1.57	27.141	93.3	.699		
789	4.73	34.502	2.81	2.48	32.0	.00	41.7	75.1	600	6.09	34.573	2.00	27.224	85.5	.797		
879A	4.33	34.504						70.8	700	5.27	34.526	2.48	27.290	79.2	.887		
887	4.31	34.506	3.14	2.68	35.4	.00	38.0	70.4	800	4.67	34.501	2.85	27.339	74.6	.973		
986	3.97	34.549	3.49	2.35	39.0	.00	39.4	63.8	1000	3.94	34.555	3.52	27.460	63.1	1.128		
1085A	3.80	34.601						58.2	1200	3.66	34.702	3.94	27.605	49.3	1.260		
1179	3.69	34.693	3.88	1.95	39.5	.00	35.4	50.2									
1324	3.54	34.774	4.33	1.88	38.3	.00	31.4	42.7									
1358	3.52	34.817	5.27U	1.88	38.7	.00	33.3	39.3									

A) CAST IV. XI-01-68, 0111 GMT.

LATITUDE 18 11.9S		LONGITUDE 7 35.7E		MO/DAY/YR 11/02/68		MESSENGER TIME 0601		BOTTOM 5140M		WIND 140		SPEED 13KT		WEATHER 1		DOMINANT WAVES	
Z	T	S	O2	P04	SI03	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD		
1	17.93	35.619	5.64					222.4	0	17.93	35.619	5.64	25.781	222.4	0		
44A	17.89	35.622	5.67					221.2	10	17.92	35.619	5.65	25.784	222.1	.022		
77	16.31	35.511	5.36					193.4	20	17.91	35.620	5.65	25.786	221.9	.044		
100	14.21	35.332	4.36					162.0	30	17.90	35.621	5.66	25.789	221.6	.067		
133	13.13	35.237	3.64					147.6	50	17.72	35.613	5.61	25.829	217.8	.111		
165	12.44	35.165	3.44					139.9	75	16.45	35.521	5.38	26.062	195.7	.163		
198	11.72	35.109	3.24					130.8	100	14.21	35.332	4.36	26.417	162.0	.209		
226B	11.06								125	13.27	35.253	3.75	26.552	149.2	.248		
230	11.13	35.047	2.94					125.0	150	12.74	35.197	3.50	26.615	143.2	.286		
264	10.41	35.044U	2.96						200	11.64	35.095	3.22	26.750	130.4	.356		
329	9.24 C	34.816	3.31					110.9	250	10.84	35.023	2.95	26.840	121.8	.422		
395	8.39	34.756	1.78					102.6	300	9.72	34.869	3.15	26.916	114.6	.484		
425B	7.17 V								400	8.31	34.750	1.79	27.051	101.9	.599		
461	7.26	34.663	1.93					93.6	500	6.62	34.597	2.42	27.174	90.2	.703		
526	6.21	34.554	2.78					88.2	600	5.20	34.480	3.22	27.261	82.0	.796		
593	4.98 U	34.456	3.19						700	4.54	34.472	3.52	27.330	75.4	.882		
622B	4.96								800	4.21	34.487	3.70	27.378	70.8	.962		
660	4.63	34.457	3.44					77.4	1000	3.74	34.562	3.88	27.487	60.5	1.110		
820B	4.13								1200	3.60	34.691	4.22	27.602	49.6	1.239		
826	4.07	34.482	2.98U					69.8	1500	3.47	34.845	4.72	27.739	36.7	1.402		
919B	3.91								2000	3.19	34.927	5.15	27.832	27.9	1.632		
995	3.74	34.559	3.87					60.8	2500	2.79	34.919	5.24	27.862	25.0	1.843		
1118B	3.67								3000	2.52	34.912	5.33	27.880	23.3	2.049		
1215B	3.59								3500	2.41	34.916	5.31	27.893	22.1	2.254		
1412B	3.52								4000	2.37	34.896	5.39	27.880	23.4	2.469		
1590D	3.44	34.882	4.86					33.7	4500	2.40	34.893	5.37	27.875	23.8	2.700		
1606B	3.44								5000	2.45	34.889	5.46	27.868	24.5	2.947		
1845D	3.30	34.914	5.13					30.0									
2082D	3.12	34.931	4.94U					27.1									
2229D	3.00	34.925	5.18					26.5									
2576D	2.74	34.920	5.26					24.6									
2618D	2.72	34.913						25.0									
2822D	2.60	34.904	5.32					24.6									
3069D	2.50	34.918	5.33					22.7									
3315D	2.43	34.920	5.38					22.0									
3561D	2.396	34.916	5.29					22.1									
3611D	2.377	34.895	5.38					23.5									
3808D	2.37	34.901	5.40					23.0									
3858D	2.378	34.894						23.6									
3908E	2.37	34.898	5.38					23.2									
4054D	2.378	34.895	5.40					23.5									
4102E	2.374	34.897						23.3									
4150E	2.38	34.893	5.36					23.7									
4397E	2.399	34.904	5.36					23.0									
4406E	2.40	34.895						23.7									
4595E	2.41	34.893	5.02U					23.9									
4643E	2.42	34.890						24.2									
4775E	2.449	34.891						24.4									
4890E	2.44	34.894	5.43					24.1									
4965E	2.449	34.890						24.5									
5019E	2.455	34.890	5.46					24.5									

- A) A PRETRIP MAY HAVE STARTED WITH THIS NANSEN BOTTLE SO ALL THE DEPTHS FOR THIS CAST BELOW THIS LEVEL ARE SLIGHTLY UNCERTAIN.
- B) CAST IX XI-02-68, 1326 GMT.
- C) MEAN VALUE OF 9.27 AND 9.21 DEGREES.
- D) CAST VI. XI-02-68, 1052 GMT. TWELVE OXYGEN SAMPLES WERE COLLECTED FROM THE FOURTEEN NANSEN BOTTLES ON THIS CAST, BUT NO RECORD WAS MADE TO INDICATE THE LEVEL FROM WHICH THEY WERE DRAWN. THE VALUES IN THE ORDER DETERMINED ARE 4.86, 5.13, 4.94, 5.18, 5.26, 5.32, 5.33, 5.38, 5.29, 5.38, 5.40, 5.40. COMPARING THE OXYGEN VERSUS DEPTH CURVES FOR STATIONS 211 - 216 WOULD SUGGEST THE ARRANGEMENT GIVEN.
- E) CAST I. XI-02-68, 0300 GMT.
- V) BECAUSE OF TIME DIFFERENCES, OVERLAPPING CASTS SHOW SOME DIFFERENCES. THIS SAMPLE HAS BEEN DELETED FOR THE INTERPOLATION.

LATITUDE 11 59.0S			LONGITUDE 11 12.5E			MO/DAY/YR 11/04/68			MESSENGER TIME 1043			BOTTOM 3518M	WIND 150	SPEED 03KT	WEATHER 2	DOMINANT WAVES 140 05 14		
Z	T	S	O2	P04	S103	N02	N03	DT	Z	T	S	O2	S1GT	DT	DD			
3	23.49	35.865	5.06	.18	3.2	.02		347.5	0	23.49	35.865	5.06	24.466	347.5	0			
52	15.91	35.582	1.52	1.53	8.2	.36		179.4	10	22.03	35.769	4.36	24.814	314.4	.033			
100	14.50	35.464	1.12	1.79	11.2	.03		158.2	20	20.16	35.678	3.47	25.256	272.4	.063			
198	12.93	35.270	1.19	1.94	13.0	.03		141.4	30	18.55	35.625	2.72	25.632	236.6	.088			
201	12.87	35.272		1.95	13.1	.01		140.1	50	16.10	35.584	1.60	26.192	183.4	.13J			
247	11.94	35.156	1.08	2.04	14.0	.01		131.3	75	15.23	35.522	1.33	26.340	169.3	.175			
295	11.03	35.051	.92	2.16	16.2	.10		122.9	100	14.50	35.464	1.12	26.456	158.2	.216			
345	10.01	34.938	.65	2.40	18.7	.00		114.2	125	14.05	35.389	1.14	26.495	154.6	.256			
393	9.10	34.858	.62	2.51	20.6	.02		105.7	150	13.64	35.332	1.16	26.538	150.5	.296			
441	8.25	34.760	.58	2.72	23.1	.00		100.2	200	12.89	35.271	1.19	26.643	140.5	.371			
444		34.754			23.1				250	11.88	35.149	1.07	26.746	130.8	.441			
491	7.310	34.672	.94	2.47U	25.4	.03		93.6	300	10.93	35.039	.89	26.838	122.1	.508			
538	6.760	34.637	1.09	2.84	27.3	.05		89.0	400	8.98	34.843	.61	27.020	104.8	.629			
588	6.293	34.602	1.36	2.86	28.7	.00		85.7	500	7.19	34.664	.97	27.148	92.6	.736			
684	5.47	34.542	1.91	2.81	31.7	.03		80.3	600	6.19	34.597	1.43	27.230	84.9	.833			
687	5.440	34.539		2.72U	31.5	.01		80.2	700	5.33	34.536	2.00	27.291	79.1	.923			
780	4.82	34.565	2.44	2.71	33.2	.08		71.3	800	4.73	34.565	2.53	27.383	70.4	1.007			
971	4.228	34.571	3.21	2.64	38.3	.04		64.7	1000	4.19	34.587	3.30	27.459	63.2	1.159			
1206	4.03	34.724	3.85	2.53	36.0	.01		51.2	1200	4.03	34.719	3.84	27.581	51.6	1.294			
1439	3.83	34.861	4.56	2.18	31.7	.00		38.9	1500	3.79	34.904	4.77	27.753	35.3	1.462			
1442	3.832	34.866		1.88	31.5	.00		38.6										

RV ARGO

## CIRCE EXPEDITION IX

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	LATITUDE 8 18.8S		LONGITUDE 9 00.3E		MO/DAY/YR 11/10/68		MESSENGER TIME 1732		BOTTOM 4366M	WIND 200	SPEED 06KT	WEATHER 1	DOMINANT WAVES 190 05 07		
Z	T	S	O2	P04	S103	N02	N03	DT	Z	T	S	O2	SIGT	DT	DD
0	24.61	35.886	4.94	.25				377.7	0	24.61	35.886	4.94	24.149	377.7	0
45	15.76	35.561	1.94	1.46				177.7	10	22.04	35.710	4.05	24.765	319.1	.035
101	14.47	35.463	1.80	1.65				157.7	20	19.82	35.613	3.29	25.296	268.6	.064
202	12.99	35.279						141.9	30	17.94	35.570	2.65	25.742	226.2	.089
205	12.90	35.271	1.70	1.82				140.7	50	15.64	35.551	1.93	26.270	175.9	.130
223	12.61	35.237	1.62	1.80				137.7	75	15.07	35.506	1.86	26.364	167.0	.173
302	10.97	35.036	1.76	1.95				123.0	100	14.49	35.464	1.80	26.458	158.1	.214
353	10.15	34.952	.80	2.35				115.4	125	14.21	35.430	1.78	26.494	154.7	.254
404	9.03	34.836	.58	2.59				106.2	150	13.87	35.388	1.75	26.532	151.1	.293
452	7.91	34.726						97.9	200	13.03	35.283	1.70	26.625	142.3	.369
455		34.725	.75	2.42U					250	12.06	35.167	1.67	26.726	132.6	.441
504	7.16	34.663	1.03	2.58				92.3	300	11.01	35.041	1.76	26.824	123.4	.508
546	6.58	34.610	1.43	2.76				88.7	400	9.12	34.845	.60	26.997	107.0	.631
603	6.04	34.582	1.77	2.69				84.1	500	7.21	34.668	1.00	27.148	92.6	.739
703	5.26	34.584U							600	6.06	34.584	1.76	27.236	84.3	.836
706	5.250	34.524	2.20	2.69				79.2	700	5.28	34.525	2.18	27.288	79.4	.926
804	4.71	34.516	2.79	2.69				73.8	800	4.73	34.517	2.77	27.344	74.1	1.011
1003	4.23	34.591	3.36	2.33				63.2	1000	4.23	34.590	3.35	27.457	63.4	1.167
1202	4.19	34.752	3.96	2.11				50.7	1200	4.19	34.750	3.95	27.589	50.8	1.303
1505	3.83	34.888	4.83	1.70				36.9	1500	3.84	34.885	4.82	27.734	37.1	1.473
1508	3.845	34.886						37.2							



LATITUDE 8 04.55		LONGITUDE 5 29.3E		MO/DAY/YR 11/11/68		MESSENGER TIME 1612		BOTTOM 5103M		WIND 220		SPEED 08KT		WEATHER 1		DOMINANT WAVES 190 04 08	
Z	T	S	Q2	P04	S103	N02	N03	DT	Z	T	S	Q2	SIGT	DT	DD		
0	24.85	35.879	4.91	.21	1.1	.00	0.3	385.1	0	24.85	35.879	4.91	24.071	385.1	0		
8	24.47	35.887	4.96	.19		.01	0.2	373.6	10	24.41	35.863	4.97	24.194	373.5	.038		
13A	24.33	35.558U	4.97	.20	1.2	.00	0.3		20	24.28	35.854	4.97	24.226	370.4	.075		
22B	24.26	35.863	4.97					369.3	30	23.36	35.787	5.03	24.447	349.3	.111		
32B	23.13	35.770	5.05	.18	1.7	.00	1.9	344.3	50	15.68	35.545	1.67	26.257	177.1	.164		
41C	16.66	35.609	2.57	1.23	5.9	.28	7.7	194.0	75	14.42	35.287	1.74	26.338	169.5	.208		
47A	15.92	35.183U	2.10	1.40	6.9	.31	21.4		100	13.74	35.430	1.93	26.418	161.9	.250		
50C	15.68	35.545	1.67					177.1	125	13.17	35.158	1.87	26.499	154.2	.290		
94A	13.90	35.275U	1.80	1.67	9.4	.03	25.3		150	12.67	35.132	1.83	26.579	146.6	.329		
100B	14.25	35.430	1.93						200	12.07	35.176	1.80	26.731	132.2	.401		
141A	12.90	35.396U	1.83	1.64	10.1	.01	26.3		250	11.03	35.051	1.51	26.829	122.9	.467		
188A	12.14	35.075U	1.82	1.81		.03	28.8		300	10.24	34.966	1.19	26.904	115.7	.530		
1920	12.16	35.177						133.8	400	8.80	34.818	1.24	27.028	104.0	.647		
236	11.27	35.073	1.76	1.90	12.7			125.5	500	7.32	34.671	1.16	27.134	93.9	.754		
282	10.52	35.003	1.04	2.22	15.1	.00	36.1	117.8	600	5.90	34.561	1.71	27.240	83.9	.851		
330	9.79	34.907	1.53	2.16	15.9	.00	35.0	112.9	700	5.21	34.520	2.33	27.292	79.0	.941		
378	9.19	34.842	1.29	2.35	17.8	.01	38.4	108.2	800	4.58	34.508	2.93	27.355	73.0	1.025		
389D	8.99	34.834						105.8	1000	4.21	34.598	3.40	27.465	62.6	1.179		
472	7.67	34.701	1.07	2.60	22.0	.01	42.6	96.4	1200	4.08	34.757	4.07	27.607	49.2	1.312		
567	6.41	34.597	1.51	2.75	26.4	.01	44.0	87.5	1500	3.87	34.904	4.90	27.746	36.0	1.478		
588D	6.03	34.570						84.8	2000	3.37	34.941	5.50	27.824	28.6	1.714		
711	5.18	34.519	2.40	2.75	30.7	.01	42.5	78.7	2500	2.93	34.926	5.42	27.855	25.6	1.933		
786D	4.61	34.505						73.6	3000	2.63	34.911	5.43	27.870	24.3	2.146		
830	4.53	34.517	3.07	2.49	31.3	.01	35.5	71.9	3500	2.50	34.904	5.30	27.876	23.7	2.362		
950	4.25	34.562	3.26	2.46	35.8	.01	38.0	65.6	4000	2.36	34.889	5.30	27.875	23.8	2.583		
1189	4.08	34.747	4.03	2.10	31.7	.01	32.1	50.0	4500	2.37	34.885	5.42	27.871	24.1	2.814		
1227D	4.08	34.783						47.3	5000	2.43	34.885	5.43	27.866	24.6	3.061		
1431	3.93	34.883	4.80	1.83	27.4	.01	26.5	38.3									
1516E	3.85	34.909	4.92	1.65	26.3			25.4									
1713D	3.65	34.938						31.4									
1760E	3.60	34.941	5.32	1.50	26.1			23.0									
2003E	3.37	34.941	5.50	1.46	28.9			22.2									
2249E	3.13	34.935	5.45	1.47	32.6			22.6									
2492E	2.93	34.929						25.5									
2503E	2.93	34.927	5.42	1.53	38.1			22.9									
2733E	2.78	34.921	5.45	1.56	40.8			23.2									
2946F	2.68	34.916	5.34U	1.57	43.5			23.3									
2972E	2.64	34.912	5.44	1.57	44.8			23.5									
3183F	2.56	34.908						24.0									
3192F	2.57	34.911	5.38	1.60	45.6			23.9									
3423F	2.50	34.906						23.7									
3432F	2.51	34.905	5.34	1.60	49.3			24.3									
3667F	2.41	34.898						23.5									
3677F	2.413	34.899	5.23	1.82U	53.2			24.9									
3915F	2.366	34.894	5.33		53.6			24.4									
3960G	2.36	34.890	5.30	1.76U	54.4	.00		24.5									
4194G	2.37	34.889						23.9									
4203G	2.36	34.891	5.32	1.76U	54.6	.00		23.7									
4432G	2.36	34.886						24.0									
4441G	2.37	34.886	5.41	1.60	52.5			24.3									
4677G	2.384	34.886						24.2									
4687G	2.389	34.885	5.44	1.62	53.7			24.2									
4927G	2.41	34.882						24.7									
4937G	2.425	34.887	5.45	1.60	53.1			23.7									
5014G	2.427	34.885	5.43	1.62	55.5			24.0									

A) THE SALINITY SAMPLE BOTTLE NUMBERS ON CAST I FROM 13 TO 188 METERS, INCLUSIVE, APPEAR TO HAVE BEEN ENTERED INCORRECTLY ON THE ORIGINAL DATA SHEET. THE INTERPOLATED VALUES ARE BASED ON THE SALINITY VALUES FROM CASTS X AND XI.

B) CAST X. XI-12-68, 0149 GMT.

C) CAST XI. XI-12-68, 0208 GMT.

D) CAST VII. XI-11-68, 2321 GMT.

E) CAST IX. XI-12-68, 0048 GMT.

F) CAST VI. XI-11-68, 2151 GMT.

G) CAST III. XI-11-68, 1828 GMT.

V) BECAUSE OF TIME DIFFERENCES, OVERLAPPING CASTS SHOW SOME DIFFERENCES. THIS SAMPLE HAS BEEN DELETED FOR THE INTERPOLATION.

RV ARGO

## CIRCE EXPECTION IX

217

LATITUDE 7 55.9S LONGITUDE 1 37.9E MO/DAY/YR 11/13/68 MESSENGER TIME 0031										BOTTOM 5385M	WIND 160	SPEED 10KT	WEATHER	DOMINANT WAVES 180 04		
Z	T	S	O2	PO4	SI03	NO2	NO3	DT		Z	T	S	O2	SIGT	DT	DD
0	23.68	35.667	4.99	.23	4.0	.04	0.1	367.1		0	23.68	35.667	4.99	24.261	367.1	0
29	22.22	35.698	5.12	.23	4.3	.01	0.0	324.7		10	23.18	35.675	5.03	24.414	352.5	.036
36	19.36	35.677	4.30	.59	8.2	.11	5.6	252.6		20	22.67	35.686	5.08	24.567	337.9	.071
99	14.84	35.518	1.83	1.65		.01	22.9	161.3		30	21.83	35.690	5.01	24.810	314.8	.103
198		35.284								50	18.36	35.621	3.75	25.677	232.3	.158
201	12.91	35.270	1.76	1.79	12.5	.00	27.1	141.0		75	16.56	35.550	2.77	26.058	196.1	.212
247	12.31	35.204	1.78	1.84	13.5	.07	28.2	134.6		100	14.80	35.510	1.83	26.426	161.1	.258
298	11.24	35.071	1.77	2.19	14.4	.00	29.6	125.1		125	13.99	35.352	1.81	26.479	156.1	.298
345	10.31	34.972	.84	2.29	18.2	.01	34.8	116.6		150	13.41	35.262	1.79	26.531	151.2	.338
395	9.31	34.869	.76	2.58	23.4	.01	37.6	108.1		200	12.91	35.267	1.76	26.636	141.2	.413
444		34.785								250	12.25	35.196	1.78	26.711	134.0	.485
447	8.39	34.769	1.17	2.56	22.4			101.6		300	11.20	35.066	1.73	26.810	124.7	.553
494	7.70	34.707	1.19	2.70	24.3	.00	40.2	96.4		400	9.22	34.858	.80	26.992	107.4	.677
535	7.03	34.705U	1.43	2.66	26.6	.00	40.2			500	7.60	34.698	1.22	27.116	95.7	.787
590	6.26	34.585	1.68	2.76	28.7	.00	41.2	86.5		600	6.12	34.573	1.74	27.220	85.9	.886
690	5.40	34.523	2.30	2.80	33.0	.00	39.2	80.9		700	5.37	34.526	2.34	27.277	80.4	.977
693	5.398									800	4.75	34.510	2.71	27.337	74.7	1.064
789	4.80	34.508	2.66	2.84	33.2	.00	38.4	75.4		1000	4.17	34.599	3.51	27.471	62.1	1.219
983	4.19	34.586	3.45	2.48	36.5	.00	35.5	63.2		1200	4.05	34.746	4.12	27.601	49.8	1.351
1178	4.06	34.736	4.04	2.10	41.0	.00	32.2	50.6		1500	3.84	34.924	5.03	27.764	34.3	1.515
1475	3.86	34.904	4.98	1.86	28.5	.00	26.0	36.0								
1478	3.858	34.907						35.8								

RV ARGO

## CIRCE EXPECTION IX

221

LATITUDE 7 26.7S LONGITUDE 1 40.3W MO/DAY/YR 11/16/68 MESSENGER TIME 0327										BOTTOM 3556M	WIND 150	SPEED 13KT	WEATHER	DOMINANT WAVES 150 05 07		
Z	T	S	O2	PO4	SI03	NO2	NO3	DT		Z	T	S	O2	SIGT	DT	DD
0	23.53	35.788	4.97					354.2		0	23.53	35.788	4.97	24.396	354.2	0
49	22.35	35.874	4.77					315.5		10	23.29	35.804	4.93	24.479	346.3	.035
69	19.93	35.851	3.63					254.1		20	23.05	35.821	4.89	24.562	338.4	.069
99	14.79	35.495	1.82					162.0		30	22.81	35.838	4.85	24.645	330.5	.103
198		35.109								50	22.25	35.875	4.72	24.831	312.8	.168
201	11.53	35.100	1.89					128.1		75	18.90	35.774	3.24	25.657	234.2	.236
247	10.64	34.997	2.02					120.2		100	14.76	35.490	1.82	26.421	161.6	.287
297	9.94	34.915	1.92					114.7		125	13.96	35.381	1.84	26.508	153.3	.327
347	9.39	34.859	1.81					110.1		150	13.16	35.280	1.86	26.596	145.0	.365
396	8.75	34.789	1.81					105.5		200	11.56	35.103	1.89	26.771	128.4	.436
399		34.727								250	10.59	34.991	2.02	26.861	119.9	.500
448	8.10	34.722	1.78					100.9		300	9.91	34.911	1.91	26.918	114.4	.562
495	7.54	34.682	1.71					96.0		400	8.70	34.783	1.81	27.016	105.1	.679
536	7.06	34.640	1.58					92.7		500	7.48	34.678	1.69	27.117	95.6	.787
592	6.35	34.580	1.93					88.0		600	6.25	34.575	1.98	27.205	87.3	.887
691	5.368	34.520	2.51					80.8		700	5.31	34.516	2.57	27.277	80.4	.980
695	5.342	34.518						80.6		800	4.65	34.499	3.15	27.340	74.4	1.066
791	4.69	34.498	3.11					75.0		1000	4.15	34.595	3.72	27.470	62.2	1.220
987	4.15	34.583	3.69					63.0		1200	4.09	34.747	4.11	27.598	50.0	1.353
1182	4.10	34.738	4.06					50.9		1500	3.91	34.907	5.01	27.743	36.3	1.521
1481	3.912	34.899	4.95					36.9								
1484	3.912	34.897						37.0								

LATITUDE 7 47.15		LONGITUDE 6 09.0W		MO/DAY/YR 11/18/68		MESSENGER TIME 0733		BOTTOM 4605M		WIND 150		SPEED 16KT		WEATHER 2		DOMINANT WAVES 140 05 GR	
Z	T	S	O2	P04	SIO3	NC2	NC3	DT	Z	T	S	O2	SIGT	DT	DD		
0	24.13	36.001	4.91	1.8	1.3	.00	0.0	355.7	0	24.13	36.001	4.91	24.380	355.7	0		
17	23.45	36.176	4.94	1.16	0.9	.01	0.0	323.9	10	23.70	36.118	4.93	24.598	335.0	.035		
45	22.94	36.194	5.00	1.17	1.1	.01	0.0	308.5	20	23.40	36.164	4.95	24.721	323.3	-.068		
70	18.73	35.892	3.52	.90	3.7	.32	10.0	221.6	30	23.21	36.148	4.97	24.762	319.3	-.100		
99	15.47	35.592	2.70	1.40	6.2	.06	18.8	169.2	50	22.19	36.134	4.73	25.045	292.4	-.161		
149	12.09	35.171	2.36	1.67	9.8	.01	25.6	133.0	75	18.07	35.836	3.33	25.913	209.9	-.225		
198	10.98	35.036	2.47	1.84	11.2	.01	27.7	123.2	100	15.38	35.581	2.69	26.353	168.0	-.273		
203A	10.52 V	34.981V							125	13.39	35.350	2.52	26.602	144.4	-.312		
248	10.21	34.947	2.28	2.02	13.3	.00	29.6	116.8	150	12.05	35.167	2.36	26.727	132.6	-.348		
297	9.74	34.893	2.07	2.11	14.6	.01	32.3	113.1	200	10.94	35.032	2.47	26.829	122.9	-.414		
347	9.22	34.839	1.88	2.25	16.1	.00	34.8	108.9	250	10.19	34.944	2.27	26.895	116.6	-.476		
396	8.73	34.788	1.90	2.36	17.4	.01	36.2	105.2	300	9.71	34.889	2.06	26.935	112.9	-.537		
400A	8.51 V	34.763V							400	8.68	34.783	1.89	27.019	104.9	-.653		
494	7.39	34.664	1.76	2.60	21.6	.01	39.3	95.3	500	7.30	34.657	1.78	27.127	94.6	-.760		
592	5.99	34.555	2.29	2.71	25.9	.00	40.8	85.5	600	5.91	34.549	2.35	27.229	85.0	-.858		
597A	6.02 V	34.554							700	5.17	34.496	3.02	27.278	80.3	-.949		
689	5.24	34.500	2.97	2.64	28.6	.00	38.2	80.8	800	4.61	34.485	3.39	27.333	75.1	1.035		
786	4.68	34.484	3.35	2.61	31.5	.00	37.8	75.9	1000	4.16	34.600	3.70	27.472	62.0	1.190		
794A	4.70 V	34.485							1200	4.11	34.744	4.11	27.592	50.6	1.324		
883	4.29	34.510	3.57	2.55	33.8	.00	37.0	69.9	1500	3.89	34.910	5.08	27.748	35.8	1.492		
981	4.17	34.583	3.67	2.50	34.4	.01	35.5	63.2	2000	3.36	34.937	5.59	27.822	28.8	1.728		
1238A	4.10	34.767						48.7	2500	2.96	34.920	5.55	27.848	26.4	1.950		
1248A	4.09	34.772	4.24	2.17	29.5	.00	30.4	48.2	3000	2.62	34.904	5.52	27.865	24.7	2.166		
1483A	3.92	34.907						36.4	3500	2.44	34.896	5.52	27.874	23.9	2.382		
1493A	3.90	34.909	5.06	1.66	24.7		24.9	36.0	4000	2.34	34.889	5.62	27.876	23.7	2.602		
1724A	3.66	34.944						31.1	4500	2.32	34.883	5.64	27.873	23.9	2.831		
1734A	3.64	34.944	5.46	1.52	23.7		22.6	30.9									
1964A	3.43	34.945						28.8									
1973A	3.41	34.940	5.58	1.52	27.4		22.5	29.0									
2197A	3.14	34.934	5.64		30.2		22.2	27.0									
2333B	3.12	34.932	5.50					27.0									
2436B	3.01	34.925	5.57	1.56	34.0		23.1	26.5									
2668B	2.81	34.916	5.51					25.5									
2677B	2.80	34.916	5.52	1.60	38.8		22.6	25.4									
2909B	2.65	34.909	5.50					24.7									
2918B	2.65	34.906	5.50	1.61	41.5		23.6	24.9									
3151B	2.56	34.903	5.55					24.4									
3160B	2.56	34.901	5.56	1.66	43.0		23.6	24.5									
3387C	2.47	34.903	5.49					23.6									
3393B	2.48	34.896	5.43V	1.63	46.2		23.5	24.2									
3576C	2.42	34.897	5.54	1.62	46.3		23.7	23.7									
3672C	2.40	34.895	5.51	1.63	48.2		23.7	23.7									
3767C	2.39	34.894	5.55					23.7									
3862C	2.37	34.892	5.59	1.68	48.6		23.9	23.7									
3882B	2.358	34.891	5.65V					23.6									
3958C	2.35	34.889	5.62	1.72	49.3		23.9	23.7									
4055C	2.34	34.890	5.61	1.65	49.5		23.9	23.6									
4104C	2.34	34.886	5.64					23.9									
4152C	2.33	34.896	5.60	1.67	50.4		23.6	23.0									
4201C	2.33	34.889	5.70U	1.65	49.5		23.9	23.6									
4250C	2.331	34.886	5.63	1.61	49.6		23.8	23.8									
4297C	2.326	34.884	5.64	1.66	49.3		24.0	23.9									
4325B	2.335	34.882	5.64					24.1									
4347C	2.312	34.885	5.62					23.7									
4396C	2.318	34.883	5.62	1.68	51.1		23.9	23.9									
4446C	2.325	34.882	5.65	1.69	50.5		24.3	24.1									

A) CAST VI. XI-18-68, 0555 GMT.

B) CAST IV. XI-18-68, 0341 GMT.

C) CAST II. XI-18-68, 0058 GMT.

V) BECAUSE OF TIME DIFFERENCES, OVERLAPPING CASTS SHOW SOME DIFFERENCES. THIS SAMPLE HAS BEEN DELETED FOR THE INTERPOLATION.



## RV ARGO

## CIRCE EXPEDITION IX

230

LATITUDE 8 10.35		LONGITUDE 9 01.5W		MO/DAY/YR 11/21/68		MESSENGER TIME 1034		BOTTOM 3804M		WIND 130		SPEED 13KT		WEATHER 2		DOMINANT WAVES 120 05 10	
Z	T	S	O2	P04	S103	N02	N03	DT	Z	T	S	O2	SIGT	DT	DD		
0	24.13	36.043	4.93	.23	3.8	.00	0.4	352.7	0	24.13	36.043	4.93	24.412	352.7	0		
58	23.59	36.227	5.02	.23	3.1	.00	0.2	324.2	10	24.04	36.074	4.95	24.463	347.8	.035		
78	22.34	36.297	4.73	.33	3.2	.06	1.1	284.7	20	23.94	36.105	4.96	24.515	342.9	.070		
99	20.60	36.187	4.23	.58	4.5	.33	11.6	246.8	30	23.85	36.137	4.98	24.567	337.9	.104		
201		35.087							50	23.66	36.201	5.01	24.670	328.1	.171		
204	11.28	35.073	2.16	1.97	12.3	.00	27.5	125.7	75	22.56	36.291	4.78	25.059	291.0	.249		
250	10.15	34.943	2.01	2.06	16.4	.01	31.0	116.1	100	20.49	36.172	4.20	25.543	245.1	.317		
301	9.55	34.874	1.86	2.22	16.1		33.6	111.5	125	17.90	35.849	3.57	25.963	205.1	.374		
350	8.96	34.809	1.98	2.32	17.3	.00	34.1	107.2	150	15.55	35.575	3.03	26.309	172.2	.422		
400	8.47	34.763	1.91	2.40	20.5	.01	35.7	103.2	200	11.56	35.108	2.21	26.776	128.0	.499		
450		34.712							250	10.15	34.943	2.01	26.901	116.1	.563		
453	7.93	34.705	2.10	2.47	21.0	.01	36.5	99.7	300	9.56	34.874	1.86	26.948	111.6	.623		
501	7.48	34.667	2.10	2.56	22.8	.01	36.6	96.3	400	8.47	34.763	1.91	27.036	103.2	.737		
542	6.92	34.623	2.09	2.66	23.9	.00	38.0	92.1	500	7.49	34.668	2.10	27.108	96.4	.845		
600	6.24	34.569	2.36	2.71	26.2	.00	39.8	87.5	600	6.24	34.569	2.36	27.203	87.5	.946		
701	5.30	34.512	2.85	2.78	29.6	.01	38.9	80.6	700	5.31	34.514	2.84	27.275	80.6	1.038		
703	5.262	34.505						80.7	800	4.60	34.487	3.38	27.335	74.9	1.124		
801	4.60	34.488	3.39		33.6	.00	38.2	74.8	1000	4.07	34.571	3.96	27.460	63.1	1.280		
1000	4.067	34.571	3.96	2.56	41.3	.01	35.3	63.1	1200	4.01	34.744	4.21	27.603	49.6	1.413		
1197	4.01	34.743	4.20	2.32	40.4	.01	30.3	49.6	1500	3.82	34.917		27.760	34.6	1.577		
1497	3.80	34.909	5.16	1.93	33.4	.02	23.0	35.0									
1500	3.821	34.917						34.6									

## RV ARGO

## CIRCE EXPEDITION IX

243

	LATITUDE 8 22.2S		LONGITUDE 13 18.4W		MO/DAY/YR 11/26/68		MESSENGER TIME 0507		BOTTOM 2988M		WIND 120		SPEED 10KT		WEATHER		DOMINANT WAVES 140 05 10		
Z	T	S	O2	P04	S103	N02	N03	DT	Z	T	S	O2	SIGT	DT	DD				
0	24.93	35.953	4.83	.21	1.1	.01	0.0	382.1	0	24.93	35.953	4.83	24.103	382.1	0				
59	24.94	35.944	4.70	.19	1.3	.01	0.0	383.1	10	24.93	35.951	4.81	24.101	382.3	.038				
83	23.89	36.088	4.83	.20	1.5	.04	0.4	342.6	20	24.93	35.949	4.79	24.100	382.5	.077				
103	22.12	36.122	4.40	.37	2.2	.14	3.0	291.4	30	24.94	35.948	4.76	24.098	382.6	.115				
118	17.79	35.853	3.41	2.20A	4.7	.10	12.8	202.1	50	24.94	35.945	4.72	24.095	382.9	.192				
148	16.02	35.691	3.13	1.18	6.1	.14	16.2	173.9	75	24.34	36.041	4.79	24.349	358.7	.285				
168	13.98	35.424	2.68	1.46	7.2	.03	21.2	150.6	100	22.56	36.137	4.51	24.943	302.1	.369				
220	10.27	34.950	2.33	1.97	13.0	.01	29.4	117.5	125	17.38	35.811	3.34	26.064	195.5	.432				
242B	9.95	34.916						114.8	150	15.82	35.665	3.09	26.317	171.5	.479				
293	8.99	34.807	2.04	2.21	16.4	.03	33.8	107.8	200	11.32	35.080	2.39	26.799	125.7	.555				
343	8.36	34.742	2.23	2.30	18.0	.01	35.0	103.2	250	9.80	34.898	2.16	26.926	113.7	.618				
392	7.91	34.705	2.12	2.41	19.7	.02	37.2	99.5	300	8.89	34.796	2.07	26.996	107.0	.676				
437B	7.67	34.685						97.6	400	7.87	34.702	2.13	27.080	99.1	.785				
489	7.18	34.634	2.22	2.50	22.0	.00	39.9	94.7	500	7.07	34.625	2.24	27.135	93.9	.890				
586	6.18	34.559	2.46	2.60	24.7	.01	39.2	87.5	600	6.05	34.548	2.50	27.211	86.7	.988				
632R	5.76	34.527						84.8	700	5.25	34.506	2.87	27.276	80.5	1.080				
684	5.38	34.511	2.80	2.62	28.9	.01	38.7	81.6	800	4.59	34.496	3.28	27.344	74.1	1.165				
782	4.67	34.494	3.22	2.65	33.2	.05	38.8	75.1	1000	4.08	34.597	3.88	27.479	61.3	1.319				
827B	4.48	34.502						72.5	1200	4.02	34.715	4.12	27.579	51.8	1.452				
881	4.25	34.529	3.55	2.57	35.0	.01	37.4	68.1	1500	3.89	34.896	5.09	27.738	36.8	1.623				
982	4.08	34.587	3.86	2.40	35.7	.00	35.5	62.0	2000	3.18	34.923	5.55	27.828	28.3	1.858				
1199C	4.02	34.714	4.12	2.09	32.5		32.0	51.9	2500	2.90	34.912	5.59	27.847	26.4	2.075				
1267B	4.06	34.793						46.3											
1396C	3.99	34.864	4.78	1.72	26.6		27.0	40.3											
1511B	3.87	34.900						36.4											
1594C	3.64	34.926	5.30	1.50	25.5		22.6	32.2											
1756B	3.43	34.928						30.1											
1791C	3.41	34.927	5.43	1.50	28.4		22.8	30.0											
1988C	3.19	34.922	5.55	1.55	32.2		22.8	28.4											
2000B	3.11	34.923																	
2185C	3.04	34.917	5.57	1.50	34.1		23.0	27.4											
2284C	3.01	34.915	5.60	1.51	35.9		23.2	27.3											
2382C	2.97	34.919	5.59	1.55	34.7		22.9	26.6											
2479C	2.90	34.911	5.60	1.55	36.7		22.8	26.6											
2492B	2.90	34.913						26.5											
2576C	2.82	34.907	5.57	1.61	38.3		23.1	26.3											
2674C	2.71	34.905	5.64	1.61	40.3		23.2	25.5											
2688B	2.74	34.905						25.7											
2722C	2.70	34.903	5.63	1.62	40.8		23.3	25.5											
2770C	2.712	34.903	5.62	1.64	40.8		23.2	25.6											
2819C	2.68	34.902	5.62	1.61	40.9		23.0	25.4											
2866C	2.66	34.900	5.64	1.61	41.4		22.7	25.4											
2914C	2.654	34.906	5.64	1.63	41.9		23.2	24.9											
2962C	2.64	34.904	5.64	1.57	43.1		23.0	25.0											

A) THE VALUE DETERMINED FROM A REPLICATE SAMPLE WAS 2.08. THE SAMPLE WAS PROBABLY CONTAMINATED.

B) CAST IV. XI-26-68, 0306 GMT.

C) CAST II. XI-26-68, 0103 GMT.

V) BECAUSE OF TIME DIFFERENCES, OVERLAPPING CASTS SHOW SOME DIFFERENCES. THIS SAMPLE HAS BEEN DELETED FOR THE INTERPOLATION.

LATITUDE 7 08.95		LONGITUDE 21 21.1W		MO/DAY/YR 11/29/68		MESSENGER TIME 1013		BOTTOM 5365M		WIND 120		SPEED 14KT		WEATHER 1		DOMINANT WAVES 130 03 10	
Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD		
0	25.95	36.080	4.76	.20	0.6	.00	0.2	403.0	0	25.95	36.080	4.76	23.884	403.0	0		
50	25.89	36.076						401.5	10	25.94	36.079	4.77	23.887	402.7	.040		
99	22.48	36.616	4.81					265.5	20	25.93	36.078	4.77	23.891	402.4	.081		
124	19.28	36.173	3.83	.71	2.4	.05	7.6	214.6	30	25.91	36.077	4.78	23.894	402.1	.121		
143	15.96	35.625	2.54					177.4	50	25.89	36.076	4.79	23.900	401.5	.202		
163	13.90	35.379	2.23	1.52	7.6	.04	23.8	152.3	75	24.59	36.439	4.80	24.572	337.4	.295		
221	10.91	35.063	2.25	1.81	10.9	.05	28.8	120.0	100	22.37	36.605	4.78	25.351	263.3	.371		
226		35.019							125	19.10	36.140	3.76	25.885	212.5	.431		
292	9.64	34.879	2.09	2.08	13.6	.01	32.6	112.6	150	15.13	35.517	2.36	26.360	167.4	.480		
382	8.28	34.740	1.89	2.31	19.4	.00	39.0	102.2	200	11.63	35.142	2.24	26.787	126.9	.556		
450		34.741U							250	10.22	34.947	2.20	26.892	116.9	.619		
453	7.51	34.666	2.09	2.41	19.1	.01	39.0	96.8	300	9.50	34.863	2.06	26.948	111.6	.679		
500	7.10	34.632	2.24	2.45	20.8	.00	38.4	93.8	400	8.06	34.719	1.92	27.064	100.6	.792		
542	6.66	34.592	2.47	2.47	21.6	.01	40.1	91.0	500	7.10	34.632	2.24	27.136	93.8	.897		
598	6.12	34.554	2.60	2.52	23.6	.00	39.2	87.1	600	6.10	34.552	2.60	27.207	87.0	.996		
698	5.34	34.497						82.2	700	5.33	34.494	2.86	27.257	82.3	1.089		
701	5.327	34.493	2.86A	2.54	25.3	.00	38.7	82.3	800	4.57	34.544	3.13	27.384	70.2	1.174		
798	4.58	34.544	3.12A	2.49	26.8	.00	38.2	70.4	1000	4.06	34.573	3.83	27.462	62.9	1.324		
996	4.06	34.569	3.82	2.35	33.7	.01	36.2	63.2	1200	4.19	34.765	4.30	27.601	49.7	1.458		
1192	4.19	34.762	4.28	2.08	28.0	.00	30.4	50.0	1500	4.10	34.940	5.12	27.750	35.6	1.626		
1491	4.10	34.935						36.0	2000	3.36	34.946	5.74	27.829	28.1	1.862		
1494	4.100	34.939		1.62	20.0	.00	23.7	35.7	2500	2.89	34.918	5.67	27.852	25.9	2.080		
1670B	3.89	34.968	5.56	1.47	18.7	.00	22.1	31.5	3000	2.66	34.908	5.71	27.865	24.7	2.295		
1755B	3.75	34.967	5.73	1.48	18.9	.04	21.2	30.2	3500	2.53	34.911	5.94	27.879	23.4	2.512		
1765B	3.75	34.963						30.5	4000	1.82	34.839	5.68	27.879	23.5	2.721		
1860B	3.58	34.963	5.75	1.47	20.3	.03	21.2	28.9	4500	.93	34.742	5.28	27.864	24.9	2.903		
1954B	3.44	34.952	5.74	1.42	22.0	.00	22.1	28.4	5000	.75	34.718	5.27	27.857	25.5	3.066		
2134B	3.22	34.940	5.75	1.46	26.8	.08U	22.4	27.3									
2144B	3.22	34.938						27.4									
2381B	2.96	34.921	5.68		32.5	.10U	22.4	26.4									
2607B	2.83	34.918	5.66	1.47	35.9	.22U	21.8	25.5									
2616B	2.81	34.913						25.7									
2852B	2.70	34.908	5.62	1.53	38.4	.01	21.3	25.2									
3081B	2.65	34.911	5.76	1.48	37.8	.01	21.6	24.5									
3086B	2.65	34.910						24.6									
3180B	2.61	34.909	5.76	1.48	37.5		22.0	24.3									
3271B	2.60	34.913	5.89	1.46	35.1		21.4	23.9									
3364B	2.56	34.918	5.91	1.46	35.3		21.3	23.2									
3457B	2.543	34.913	5.95	1.47	35.4		21.4	23.5									
3550B	2.494	34.909						23.4									
3644C	2.40	34.899	5.86	1.50	40.5		22.1	23.4									
3877C	2.12	34.869						23.4									
3886C	2.09	34.869	5.78	1.55	51.9		23.7	23.2									
4129C	1.59	34.814	5.56	1.89	70.7		27.0	23.7									
4363C	1.04	34.759						24.2									
4372C	1.03	34.755	5.35	2.11	92.6		30.3	24.5									
4615C	.87	34.732	5.25	2.18	101.1		31.5	25.2									
4845C	.77	34.748U															
4854C	.77	34.719	5.25	2.21	105.2		31.9	25.6									
5031C	.74	34.718						25.5									
5041C	.74	34.718	5.27	2.26	106.9		32.3	25.5									
5124C	.74	34.716						25.7									
5134C	.74	34.716	5.22	2.140	109.		32.7	25.7									
5216C	.74	34.717						25.6									
5225C	.747	34.715	5.20	2.21	108.5		32.7	25.8									
5307C	.74	34.712	5.33	2.28	107.2		32.7	26.0									
5316C	.747	34.718						25.6									

A) THE OXYGEN AND NUTRIENT VALUES FOR THESE TWO LEVELS HAVE BEEN REVERSED, CORRECTING A PROBABLE MIXUP DURING SAMPLING.

B) CAST II. XI-29-68, 0832 GMT.

C) CAST I. XI-29-68, 0601 GMT.

D) THE PHOSPHATE AND SILICATE VALUES AT THIS DEPTH ARE SOMEWHAT SUSPECT.

LATITUDE 5 10.05		LONGITUDE 30 53.0W		MO/DAY/YR 12/01/68		MESSENGER TIME 1701		BOTTOM 4893M		WIND 120		SPEED 14KT		WEATHER 1		DOMINANT WAVES 140 04 06	
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD		
0	27.11	35.914	4.70	.08	0.9	.00	0.2	450.0	0	27.11	35.914	4.70	23.392	450.0	0		
56	26.87	35.907	4.73					443.2	10	27.07	35.912	4.71	23.404	448.8	.045		
96	23.58	36.546	4.63	.23	1.4	.04	0.3	300.9	20	27.02	35.911	4.71	23.417	447.5	.090		
116	19.93	36.117	3.50	1.00	2.7	.16	9.2	234.8	30	26.98	35.910	4.72	23.430	446.3	.135		
139	16.69	35.775	3.21	.97	4.5	.04	14.6	182.6	50	26.90	35.907	4.73	23.456	443.9	.224		
156	14.96	35.545	3.15	1.06	5.6	.08	16.9	161.9	75	25.80	36.312	4.68	24.106	381.9	.328		
188	12.64	35.230	3.10		8.3	.02	21.9	138.8	100	22.87	36.469	4.40	25.104	286.8	.412		
201A	11.68	35.116						129.6	125	18.54	35.971	3.39	25.898	211.2	.476		
216	10.56	34.976	2.63	1.70	11.3	.02	27.3	120.4	150	15.52	35.623	3.16	26.354	168.0	.524		
249	9.96	34.898	2.71	1.70	12.5	.01	28.3	116.3	200	11.75	35.125	2.89	26.751	130.3	.601		
286	9.33	34.830	2.70	1.85	13.9	.03	30.0	111.3	250	9.94	34.895	2.71	26.900	116.2	.665		
374		34.706	2.59	2.01	16.9	.00	33.9		300	9.10	34.805	2.67	26.971	109.5	.725		
392A	7.69	34.669						99.1	400	7.59	34.660	2.64	27.087	98.4	.835		
443	7.04	34.608	2.78		19.7	.00	35.3	94.8	500	6.19	34.543	2.95	27.189	88.8	.936		
489	6.27	34.549	2.93	2.28	22.4	.00	36.7	89.3	600	5.48	34.494	3.28	27.240	84.0	1.029		
530	6.03	34.531	3.02					87.7	700	4.79	34.471	3.53	27.302	78.0	1.118		
582A	5.54	34.495						84.6	800	4.42	34.493	3.75	27.360	72.5	1.201		
591	5.53	34.496	3.24	2.31	24.6	.02	36.4	84.4	1000	4.19	34.611	3.88	27.477	61.4	1.353		
637	5.164	34.482	3.42					81.3	1200	4.24	34.780	4.25	27.608	49.1	1.485		
686	4.857	34.471	3.50	2.36	29.1	.00	36.8	78.8	1500	4.27	34.938	5.23	27.729	37.6	1.656		
776A	4.43 V	34.476V							2000	3.48	34.950	5.87	27.821	28.9	1.902		
782	4.47	34.487	3.73	2.43	31.5	.02	36.2	73.5	2500	2.94	34.920	5.88	27.849	26.2	2.124		
971A	4.17 V	34.585V							3000	2.69	34.922	5.90	27.873	23.9	2.340		
976	4.19	34.589	3.85	2.28	32.8	.01	34.9	63.0	3500	2.56	34.915	6.06	27.879	23.4	2.556		
1172	4.23	34.756	4.18	2.02	28.7	.01	31.0	50.8	4000	1.87	34.842	5.77	27.878	23.5	2.766		
1477	4.32	34.941	5.14	1.47	20.5	.02	23.9	37.8	4500	1.01	34.750	5.37	27.864	24.8	2.950		
1507B	4.26	34.937	5.25	1.49	18.2		22.8	37.5									
1605B	4.06	34.943	5.38	1.46	18.8		22.1	35.0									
1752B	3.88	34.956						32.3									
1802B	3.80	34.960	5.79	1.41	17.6		20.8	31.2									
1998B	3.48	34.951	5.87		20.4		20.6	28.8									
2008B	3.492	34.948						29.2									
2234B	3.19	34.938	5.90	1.39	24.0		21.0	27.2									
2483B	2.964	34.921						26.4									
2492B	2.95	34.922	5.88	1.47	28.7		21.5	26.2									
2675B	2.84	34.914	5.84	1.39	30.1		21.3	25.9									
2769B	2.77	34.898	5.80	1.49	33.2		21.9	26.5									
2863B	2.77	34.911	5.86	1.44	31.8		21.4	25.5									
2954B	2.71	34.925	5.92	1.48	31.8		21.3	24.0									
3005C	2.69	34.923	5.90	1.41	31.8		21.2	23.9									
3104C	2.66	34.921	5.88	1.44	32.0		21.3	23.8									
3202C	2.64	34.920	5.95	1.42	31.1		20.7	23.8									
3203D	2.63	34.901U															
3301C	2.62	34.918	5.96	1.35	31.4		20.6	23.7									
3400C	2.59	34.917	5.98	1.43	31.1		20.6	23.6									
3454D	2.55	34.896U															
3498C	2.56	34.916	6.06	1.36	30.5		20.3	23.4									
3595C	2.49	34.916	6.06	1.40	31.7		20.6	22.8									
3704D	2.37	34.882U															
3745C	2.32	34.894	6.03	1.51	37.2		21.2	23.1									
3954D	1.99	34.840U															
3996C	1.88	34.844	5.77	1.73	56.9		24.6	23.5									
4179D	1.43	34.774U															
4232C	1.33	34.788	5.53	1.88	78.3		27.3	23.9									
4301D	1.20	34.750U															
4446D	1.03	34.709U															
4473C	1.02	34.751	5.38	2.28E	91.6		30.8	24.7									
4542D	.984	34.703U															
4569C	.94	34.740	5.34	2.23E	95.8		31.5	25.1									
4638D	.864	34.689U															
4666C	.82	34.725	5.28	2.32E	100.9		32.1	25.5									
4761C	.717	34.714	5.26	2.45E	104.7		33.3	25.7									
4770C	.69	34.710						25.8									
4856C	.640	34.703						26.1									
4860C			2.52E	108.6			33.2										

A) CAST VII. XII-01-68, 1459 GMT.

B) CAST VI. XII-01-68, 1340 GMT.

C) CAST II. XII-01-68, 0850 GMT.

D) CAST IV. XII-01-68, 1126 GMT. COMPARISON OF THE DATA FOR THIS STATION AND STATION 245

INDICATES A BIAS IN THE SALINITY VALUES FOR CAST IV.

E) THESE SAMPLES WERE COLLECTED IN NON-STANDARD NUTRIENT SAMPLE BOTTLES. THE SAMPLES MAY HAVE BEEN CONTAMINATED SLIGHTLY CAUSING WHAT APPEARS TO BE HIGH PHOSPHATE CONCENTRATIONS.

V) BECAUSE OF TIME DIFFERENCES, OVERLAPPING CASTS SHOW SOME DIFFERENCES. THIS SAMPLE HAS BEEN DELETED FOR THE INTERPOLATION.

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